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Richard S. Bennett talks abcut color, a key factor in the architectural surfaces market. Heie Mr. Bennett inspects a colorant packaging machine. See page 61.

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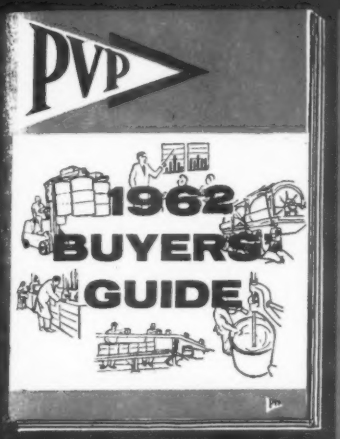

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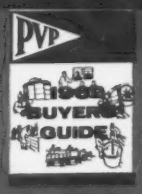

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3. SUPPLIERS' DIRECTORIES Section 3A—listing all raw material suppliers, sales agents and distributors, all raw materials and their suppliers, aerosol chemical suppliers, and trade names of all raw materials used in paint manufacture.

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4. BUYERS' GUIDE, Section 1—descriptions for all new equipment vital to paint manufacture, with names of equipment manufacturers.
5. WORLD WIDE REVIEW 1961, Section 2B—complete reviews of all important developments in paint technology—as reported by more than 40 chemical magazines.
6. SUPPLIERS' DIRECTORIES, Section 3B—listing all equipment manufacturers, sales agents and distributors, all types of equipment and their manufacturers, aerosol equipment and their suppliers, and trade names of all equipment used in paint manufacture.

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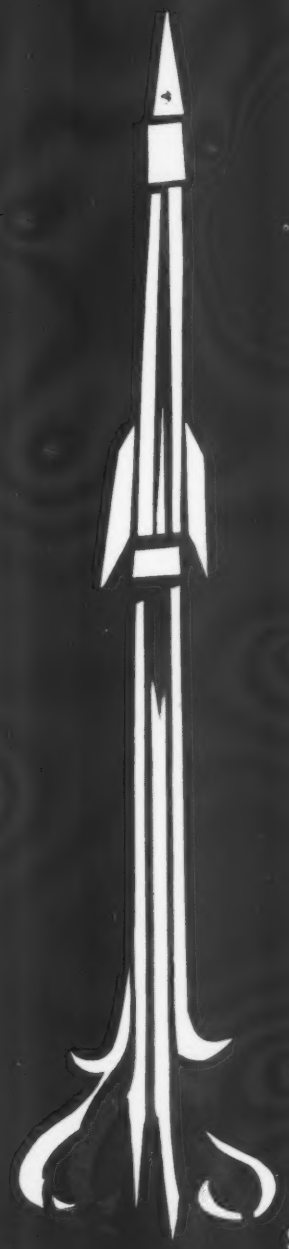

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Title (REG. U.S. PATENT OFFICE)

OCTOBER 1961

Formerly PAINT and VARNISH PRODUCTION MANAGER
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COPYRIGHT © 1961 PUBLISHED BY POWELL MAGAZINES, INC., EXECUTIVE AND EDITORIAL OFFICES, 855 AVE. OF THE AMERICAS, NEW YORK 1, N. Y. BRyant 9-0497
VOLUME 51
NO. 11

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NEXT ISSUE

Our November Convention issue will feature a series of articles on fire retardant paints covering formulation, manufacture and testing.

PAINT and VARNISH PRODUCTION is published monthly except semi-monthly in March at Easton, Pa., by Powell Magazines, Inc., John Powell, president; Ira P. MacNair, vice-president and treasurer; Alan P. Danforth, vice-president; Alice L. Lynch, secretary. Entered as second class matter at Post Office at Easton, Pa., Jan. 30th, 1952, under the Act of March 3, 1879. SUBSCRIPTION RATES POSTPAID: *United States and Canada*, 1 year $4.00; 2 years $7.00. *Mexico and Pan-American Countries*, 1 year $5.00; 2 years $8.00. All other countries, 1 year $8.00; 2 years $15.00. Remit cash in advance, with order, by bankers draft on New York funds. SINGLE COPIES: *Current issue:* $0.50; *all back numbers:* $1.00. Convention issue: $1.00. Review and Buyers' Guide: $5.00. Bound volumes: $15.00 per vol. when available. We cannot guarantee to supply back numbers and claims for missing numbers cannot be granted if received more than 60 days after date of mailing. Subscribers should promptly notify circulation department of any change in address, giving both old and new addresses and by sending address label. EDITORIAL AND EXECUTIVE OFFICES: 855 Avenue of the Americas, New York 1, N. Y. BRyant 9-0497. Printed in U. S. A.
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EDITORIAL COMMENT

Fire-Retardant Paints

IN 1960 over 11,000 lives were lost and some 70,000 seriously injured in fires, according to the National Fire Protection Association. Home fires account for half of these deaths. In addition material and property losses caused by fires amount to over one billion dollars each year.

It has been postulated that much of the loss—both human and property—is caused by the swift spread of flame through a structure. Several methods are currently being advanced to help reduce the rapid spreading of flame. One of these is concerned with the use of building materials which are flame-resistant or fire-retardant.

Properly designed paints can effectively reduce the spread of flame. It logically follows that if the rate of flame spread can be controlled, the few minutes gained might be enough for complete evacuation of personnel and allow for fire fighting equipment to effectively combat the blaze.

"The first five minutes after a blaze starts means everything to a fire fighter," says Fire Marshall Quinn of Chattanooga. After only eight or ten minutes a fire is usually fifty times its original size. Anything that slows down this spread can mean the difference between a minor blaze and a total loss."

In this connection, our November Convention issue will carry a comprehensive feature on Fire Retardant Paints. This exclusive feature will consist of a series of articles prepared by experts who will discuss formulation, testing and application of fire-retardant paints.

Plan to Attend

AT THE END of this month, two important paint conventions will be held in Washington. This year the National Paint, Varnish and Lacquer Association and the Federation of Societies for Paint Technology are meeting October 30–November 1st and November 2nd–4th respectively.

The National Association has lined up an interesting array of speakers, forums, conferences and workshops for its 74th annual meeting. The opening session will feature an address by Senator Kenneth B. Keating of New York.

Of particular interest will be three important forums, "Know Your Costs," "Traffic Problems and Regulations," and "Federal Labeling Laws" as they Pertain to the Paint Industry."

Rounding out the final session will be a talk by Leo Cherne, executive director of the Research Institute of America. His subject, "A Time of Trial," will focus on domestic and foreign developments and their relation to the American business community.

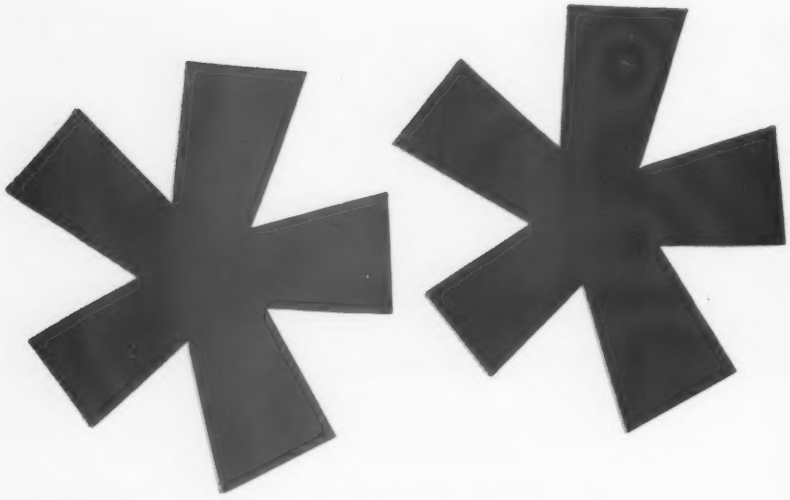
The Federation will present a program highlighted by several interesting panel discussions and round table forums. The panel discussion will include such timely topics as "Exterior House Paints," "Trend in New Vehicles", and "Trend in New Pigments". For those engaged in paint production two interesting forums have been scheduled: "Cleaning Procedures for Plant Equipment" and "Straining, Filling, Labeling and Casing".

Keynoting this years annual Federation meeting will be Dr. Carl F. Prutton, director-consultant of FMC Corp. "Looking Ahead in Technology" is the subject of Dr. Prutton's talk.

An annual highlight of the Federation's meeting is the Joseph J. Mattiello Memorial Lecture. This years lecture, entitled "Science and Society —Master or Servant", will be given by Dr. Louis A. Jordan, founder-director of the Paint Research Station, Teddington, England.

The 1961 Paint Industries Show will consist of over 100 exhibitors. Most of the exhibits will be manned by technical representatives who are qualified to discuss with those in attendance the most recent advances in raw materials, equipment, formulation and testing.

To keep abreast of the important developments taking place in the paint and varnish industry, we urge that you make plans to attend these two important meetings in Washington the week of October 30th–November 4th. DO IT NOW!



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Published monthly by
POWELL MAGAZINES, INC.
855 Ave. of the Americas
New York 1, N. Y.
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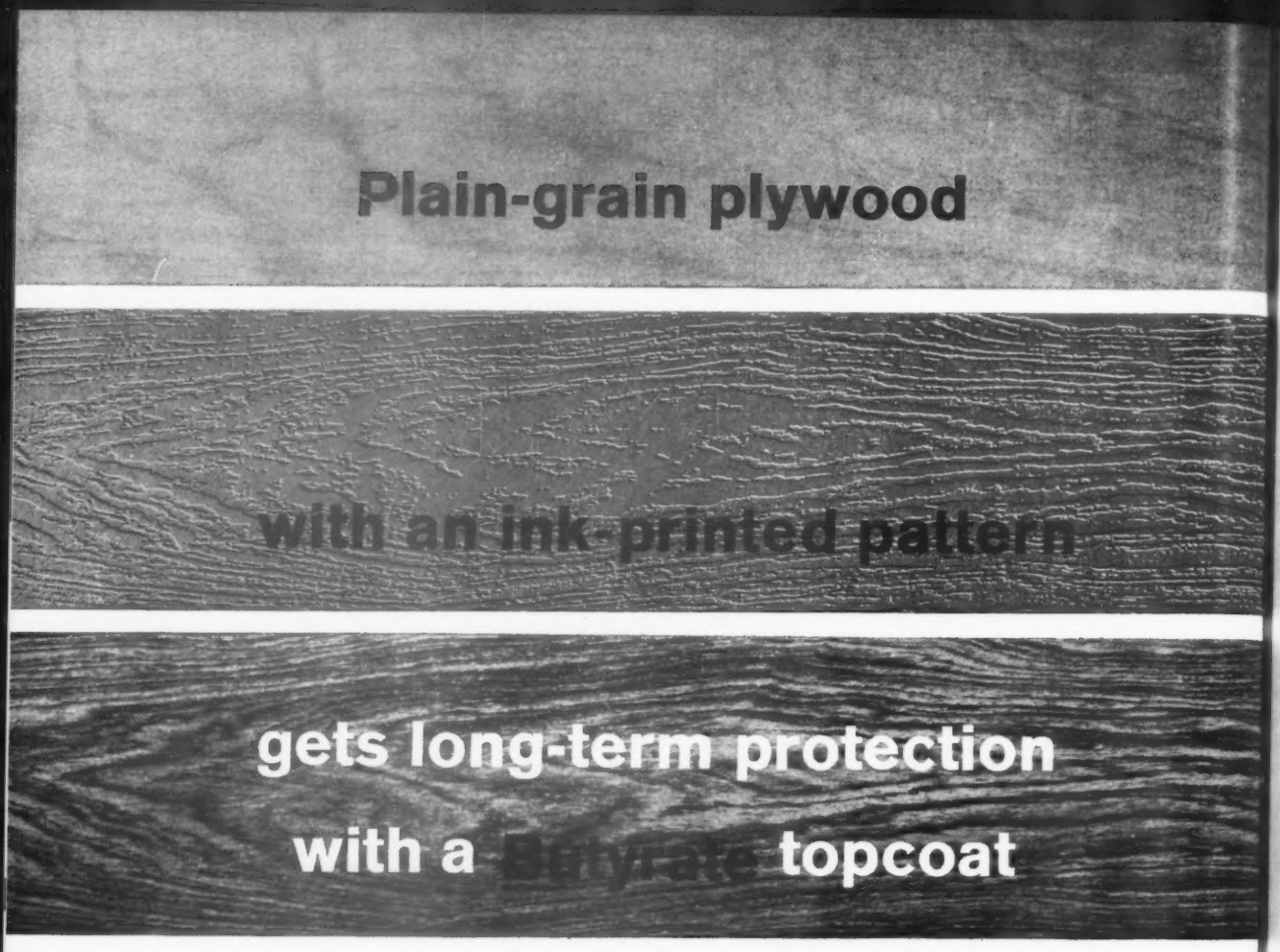

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MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

OCTOBER, 1961

A TORTOISE AND HARE MOVEMENT is indicated in the car industry by the low sales in the past month which have been attributed to the gradual reduction in 1961 model cars available. Auto executives feel that dealers haven't been pushing hard to clear out the 1961 models due to several factors: (a) Fearing auto strikes would leave them short of cars later, dealers have held on to existing stock for higher prices than usual just before new model introduction time; (b) A GM vice president said that although there is no "Buildout bonus" on GM cars this fall, (cash rebate often paid to dealers to push old model cars) GM has slated a 5 per cent rebate on 1961 models after the 1962s come out, and dealers are holding stock back for this business. It is interesting to note that on September 11 the new car inventory was 690,300 units. About 248,000 of these were 1962 models. (The first 1962 lines were to go on sale the end of September). Although seasonal factors have been taken into account, industry economists feel there is no doubt that the sales pace has fallen off recently. For example: In May, one auto maker figured sales were at an annual rate of 6,200,000 cars. In June the sales pace fell to an annual rate of 6,000,000 cars. In July it slipped below 5,900,000, and in August, it dropped to 5,300,000. Calculations of the annual rate included approximately 400,000 imported cars. In 1960, 6,147,000 American made cars were sold by U. S. dealers. Despite this gloomy picture of depreciation of car sales, officials of the automotive industry predict that the "tortoise" will become the "hare" in car sales late this month and will "boom" along next year. Strongest indications will, they feel, be in November.

CONSOLIDATED Chemical & Paint Corp. of brooklyn, N. Y., has filed a registration statement with the Securities & Exchange Commission seeking registration of $275,000 of 6.5 per cent subordinated convertible debentures due 1968 and 68,750 shares of common stock, to be offered for public sale in units consisting of $100 of debentures and 25 common shares. The offering will be made at $200 per unit on an all or none basis through underwriters headed by Armstrong & Co., Inc., and L. C. Wegard & Co., which will receive a $20 per unit commission and $15,000 for expenses. The registration statement also includes 24,000 outstanding shares to be sold by the holders to the underwriters and finders at $1 per share. The company manufactures from oil, chemicals and pigments, diverse basic paint lines which include interior and exterior oil base paints, varnishes and enamels, interior vinyl-latex emulsion paints, and water-thinnable linseed oil paints. Of the $440,000 estimated net proceeds from this financing, $62,489.61 will be used to retire a similar face amount of the company's presently outstanding six per cent registered debentures, owned by or purchased from a former stockholder; $115,000 will be used to retire obligations to banking institutions incurred in '61 to meet trade debt and for other working capital; $60,000 will be used as working capital, and the remainder will be used to open additional distribution areas

and to enlarge the company's promotional, advertising and distribution efforts in connection with its "Jet-Dri" and "Pronto" lines. Besides certain indebtedness, the company has outstanding 175,000 shares of common stock, after giving effect to a stock split in July, of which Harry N. Weiss, board chairman; Stuart K. Sherman, executive vice president, Joseph Sherman and Saul Brodsky, own 35.28 per cent, 19.19 per cent, 12.63 per cent, and 19.19 per cent, respectively.

GENERAL BUSINESS conditions reflect optimistic confidence in the business community as increased buying is predicted in all phases of economy, namely consumer, general business and government purchasing. With all-time high incomes, the consumer is somewhat more confident in buying today. The businessman's confidence is stressed in additional outlays of capital, larger inventories and good general sales prospects. The defense appropriation of $3.5 billion dollars, along with the world-wide crisis, is an added indication of bigger business. It is noted that gross national product, personal income, industrial production, construction expenditures, and a multitude of other economic measures have regained a great deal of recessional losses, and, in some cases, actually advanced to higher margins of profit. In spite of threatened strikes and general seasonal business slumps, business has sustained itself this past summer. According to the Federal Reserve Index (1957 equals 0), industrial production advanced to a new all high of 112.4 in July. The pre-recession peak of 111 set in January 1960, was cracked as a vigorous thrust of business broke the top this past spring. It has only taken five months, February to July, to rise 10 per cent from the recession low to a new high. It took 10 months after production was rock bottom in 1958 to equal the pre-recession record, and in 1954 it took 13 months. Prospects for the future are even brighter since the recovery has been so rapid. Along with this picture, increased orders being received by manufacturers, especially in heavy industry, justify greater expectations. According to The Department of Commerce, orders rose 2 per cent during July to a high of $15.2 billion.

CONSTRUCTION CONTRACTS continued on a high level during July, in keeping with the June high, due to an active increase in general housing and steady progress in non-residential construction. It has been reported that total contracts for indicated construction amounted to an approximate $3,528,500,000 in July, which is only down about 2 per cent from last year. Contracts for residential building in the month of July totalled an approximate $1,500,000,000, which shows an increase of about 13 per cent from the previous year's level. Apartment building contracts showed the sharpest increase of about 59 per cent, with single-unit housing showing a substantial increase over the previous year's level. Non-residential building contracts for July stand at approximately $1,150,000,000, which is only slightly ahead of last year's level. The gains are probably due to the increase in commercial buildings, public schools, and hospitals which somewhat offsets the declination of other non-residential dwellings.

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CLEAN UP PAINT UP

and to enlarge the company's promotional, advertising and distribution efforts in connection with its "Jet-Dri" and "Pronto" lines. Besides certain indebtedness, the company has outstanding 175,000 shares of common stock, after giving effect to a stock split in July, of which Harry N. Weiss, board chairman; Stuart K. Sherman, executive vice president, Joseph Sherman and Saul Brodsky, own 35.28 per cent, 19.19 per cent, 12.63 per cent, and 19.19 per cent, respectively.

GENERAL BUSINESS conditions reflect optimistic confidence in the business community as increased buying is predicted in all phases of economy, namely consumer, general business and government purchasing. With all-time high incomes, the consumer is somewhat more confident in buying today. The businessman's confidence is stressed in additional outlays of capital, larger inventories and good general sales prospects. The defense appropriation of $3.5 billion dollars, along with the world-wide crisis, is an added indication of bigger business. It is noted that gross national product, personal income, industrial production, construction expenditures, and a multitude of other economic measures have regained a great deal of recessional losses, and, in some cases, actually advanced to higher margins of profit. In spite of threatened strikes and general seasonal business slumps, business has sustained itself this past summer. According to the Federal Reserve Index (1957 equals 0), industrial production advanced to a new all high of 112.4 in July. The pre-recession peak of 111 set in January 1960, was cracked as a vigorous thrust of business broke the top this past spring. It has only taken five months, February to July, to rise 10 per cent from the recession low to a new high. It took 10 months after production was rock bottom in 1958 to equal the pre-recession record, and in 1954 it took 13 months. Prospects for the future are even brighter since the recovery has been so rapid. Along with this picture, increased orders being received by manufacturers, especially in heavy industry, justify greater expectations. According to The Department of Commerce, orders rose 2 per cent during July to a high of $15.2 billion.

CONSTRUCTION CONTRACTS continued on a high level during July, in keeping with the June high, due to an active increase in general housing and steady progress in non-residential construction. It has been reported that total contracts for indicated construction amounted to an approximate $3,528,500,000 in July, which is only down about 2 per cent from last year. Contracts for residential building in the month of July totalled an approximate $1,500,000,000, which shows an increase of about 13 per cent from the previous year's level. Apartment building contracts showed the sharpest increase of about 59 per cent, with single-unit housing showing a substantial increase over the previous year's level. Non-residential building contracts for July stand at approximately $1,150,000,000, which is only slightly ahead of last year's level. The gains are probably due to the increase in commercial buildings, public schools, and hospitals which somewhat offsets the declination of other non-residential dwellings.

Testing Gen-Flo in formulations using standard pebble mills.

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Gen-Flo, the balanced styrene-butadiene latex, has gained tremendous acceptance by quality-conscious paint manufacturers everywhere! This acceptance is based on Gen-Flo's many superior characteristics, and on its uniform quality, batch after batch. Completely interchangeable with other high quality latices, Gen-Flo helps reduce inventory investment, while making paint production easier and more economical. When you order Gen-Flo, you're assured of prompt, "Tailored-to-your-needs" delivery. Write today for formulation suggestions and technical data.

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Chemical Division **GENERAL**
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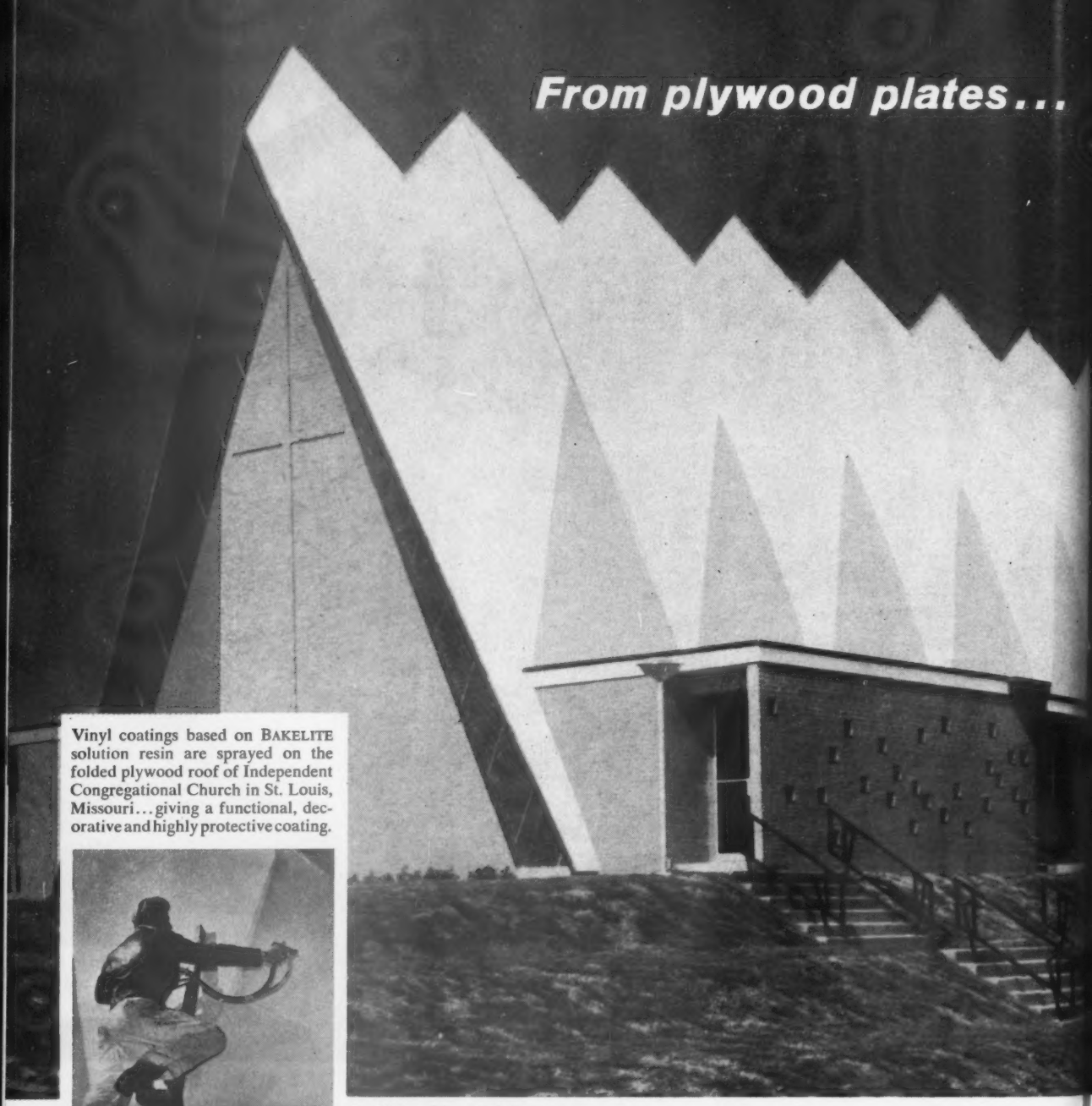
From plywood plates...



Vinyl coatings based on BAKELITE solution resin are sprayed on the folded plywood roof of Independent Congregational Church in St. Louis, Missouri... giving a functional, decorative and highly protective coating.

Architects: Manske & Dieckmann.
Coating materials by: Plas-Chem Corp., St. Louis, Mo.
Applied by: Scally Waterproofing Co., St. Louis, Mo.

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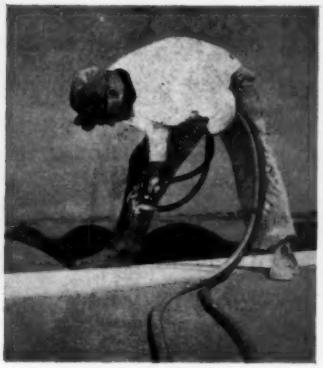
Plywood and poured concrete—two widely different building materials were used to top off these ultra modern structures. Yet coatings based on BAKELITE *Vinyl Resins* enhance design and provide excellent weathering qualities to both. In addition to offering the utmost in economy and durability, their use results in cleanly sculptured lines, unmarred by joints, seams or other discontinuities.

These tough, water and weather resistant BAKELITE vinyl solution coating resins are another important contribution from Union Carbide Plastics—a name synonymous with the utmost in quality and services throughout the coatings industry for more than twenty-five years.

. . . to reinforced concrete . . .

Reinforced concrete roofs of utility and "theme" buildings at new $50-million Los Angeles International Airport are woven into a single piece of sculptured elegance by sprayed-in-place vinyl coating.



Architects: Chas. Luckman, Welton Becket, Paul R. Williams.
Coating materials by: Better Finishes & Coatings, Inc., Newark, New Jersey
Applied by: Architectural Plastics, Inc., Los Angeles, California.

Dimension to Modern Architecture

For more information on vinyls or other coating developments, contact your Union Carbide technical representative or write today to: Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Ltd., Toronto 12.

TO SERVE YOU BETTER! In addition to the regular Union Carbide Plastics distribution points, these well-known distributors now handle the complete line of BAKELITE Brand Coating Resins:

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With the advent of Cargill Polyurethanes, the profit picture in varnishes has become exciting for the first time in many years. Manufacturers and dealers who have joined the expanding parade by switching to polyurethane varnishes report profits rarely experienced . . . profits that range from 25% to 40% higher.

The cost of raw materials for polyurethane varnishes may be slightly higher, but due to their distinct superiorities—tougher, more durable, quicker dry—they command a substantially higher retail price. Your added cost is measured in cents. Your added profit is measured in dollars.

Last year alone the sale of polyurethane varnishes tripled. Yet the retail market has been scarcely tapped. It will pay you to investigate the dramatic impact Cargill Polyurethane can make on your varnish sales and profits.

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PVP PAINT AND VARNISH PRODUCTION

MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

WASHINGTON REPORT

OCTOBER, 1961

THE FIRST SESSION, 87th Congress, adjourned without action on the President's request for added Federal Trade Commission authority, so that it might issue temporary cease and desist orders relating to advertising, unfair trade practices, and other acts prohibited by law.

Under present procedures, FTC Chairman Paul Dixon has declared, violators can move "with the speed of sound" to mislead the public, while the FTC must adopt a more leisurely "horse and buggy" or "pony express" speed to pursue them. In many instances, FTC has cited firms for illegal advertising or other practices and, years later, still had not been able to bring these acts to a halt, due to slow procedures and the large backlog.

President John F. Kennedy, endorsing the FTC's bid for temporary restraining power, told the House Committee on Interstate and Foreign Commerce that the agency is bogged down "by delays in litigation and an increasing backlog of cases." He asserted that the recent "streamlining" of FTC procedures is not enough to stem the illegal tide.

THERE WAS LITTLE DOUBT among departing Congressmen, or remaining economists in Washington, about the quickening tempo of business and commercial activity as the nation headed into a record-breaking last quarter.

The Federal Reserve Board reported in mid-September that its industrial output index increased from 112 in July to 113 in August, setting an alltime record. The mid-summer advance was mild, due to unsettled conditions in the steel and automotive industries.

Barring some unexpected cataclysm, both private and federal economists here expected to see "more bounce to the ounce" in the September and October figures. Many look for a roaring October, November and December, eclipsing all records set in the past and going significantly higher than the last quarter of '60, which, of course, actually saw industrial production declining.

New business expenditures for plant and equipment were set to go forward significantly in the last quarter. Federal estimates are that the annual rate may hit close to $36 billion before year-end. This is no new record, but it is a strong bulwark and is close to the alltime high.

THE FEDERAL TRADE Commission-Securities & Exchange Commission joint quarterly financial report on U. S. Corporation Earnings disclosed here that manufacturers' sales and earnings showed a sharp improvement in the second quarter of this year, compared with the first three months.

April-May-June sales hit an alltime record of $89.8 billion, compared with $82.6 billion in the previous period and $88.1 billion for the 1960 second quarter.

Profits after taxes amount to $4.07 billion, the report noted, or 27 per cent more than the $2.9 billion net earnings for the first quarter.

PVP

MANAGEMENT NEWSLETTER

A NEW PROGRAM for expanded commercial bank participation with the U. S. Small Business Administration to encourage more private financing and to speed up handling of loans to small business has been announced here.

Under the new cooperative program, a bank may participate with SBA in a loan to small business, with Uncle Sam providing up to $350,000 for any one loan. The participating bank must take at least a 25 per cent share. Interest charged on SBA's share is 5.5 per cent, except in officially designated "distress" areas, where interest is four per cent. The bank may set the interest rate on its share.

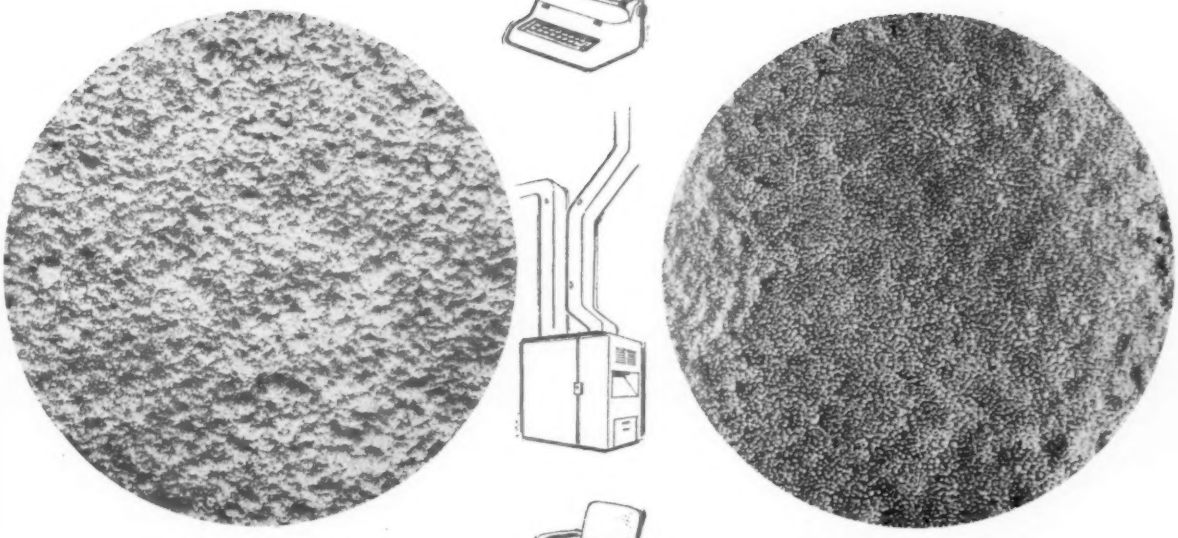
"The Simplified Bank Loan Participation Plan has the immense advantage of permitting us to rely on the bank's credit judgment, which is based on its knowledge of its customers and its experience," John E. Horne, SBA Administrator, declared here. "Many times, questions an SBA loan officer may have can be cleared up quickly by one phone call to the bank."

METHODS FOR IMPROVING sales, credit and collection controls and public relations for small marketers are among nine subjects discussed in Small Marketers Aids, Annual No. 3, published by the U. S. Small Business Administration and now available at 40 cents a copy from the U. S. Superintendent of Documents, Government Printing Office, Washington 25, D. C

SBA Administrator, John E. Horne, explained that this series is oriented twoard owners and managers of small companies to provide information which will lessen the problems of these owner-managers by broadening their management skills.

Subjects discussed in non-technical language include analysis of profits, stock management, supplier relations and assistance, credit and collection control and public relations.

CAPITAL BRIEFS: U. S. Small Business Administration has released a new Management Research Summary, "Small Business and Pattern Bargaining," available free at all SBA field offices, or by request from the agency at Washington 25, D. C..... By 1970, there will be 30 million women working in the U. S., many of them in technical jobs for which they must be trained extensively, according to the Women's Bureau, U. S. Department of Labor..... Charges of unfair labor practices filed with the National Labor Relations Board are at an alltime high, but actual work stoppages this year are setting a new post-World War II record. So is time lost from work due to industrial accidents. Workers are more careful and they are less constrained to strike and lose time..... William A. Wildhack has been named Associate Director of the National Bureau of Standards and will be responsible for measurement services to science, industry, other federal agencies, and the various states..... The Atomic Energy Commission has made available the first of a series of engineering drawings related to training in radioisotope engineering for colleges and universities. Current Soviet research in corrosion apparently is on a par with similar investigations in the western world, but there is no evidence that the Russians are on the verge of "any major breakthrough" in this field, evaluators here who recently studied 1,500 pieces of Soviet technical literature for the 1950-1960 period have concluded.



This finish contains
quality controlled
Plaskon Coating Resin

This finish contains
ordinary coating resin

Compare these two unretouched photographs of hammertone finishes on "24 gauge" steel panels. Notice the more uniform pattern and freedom from mottling in the finish on the left. It is made with quality controlled Plaskon Coating Resin. Poor quality raw materials can cause the blotchy, irregular appearance so obvious in the right hand panel.

Quality control checks are run on Plaskon Coating Resins throughout their manufacture . . . from selection of raw materials to finished resins. True . . . this extra care and attention costs a little more . . . but measured in terms of customers' satisfaction it is a shrewd investment. More details? Drop us a line.

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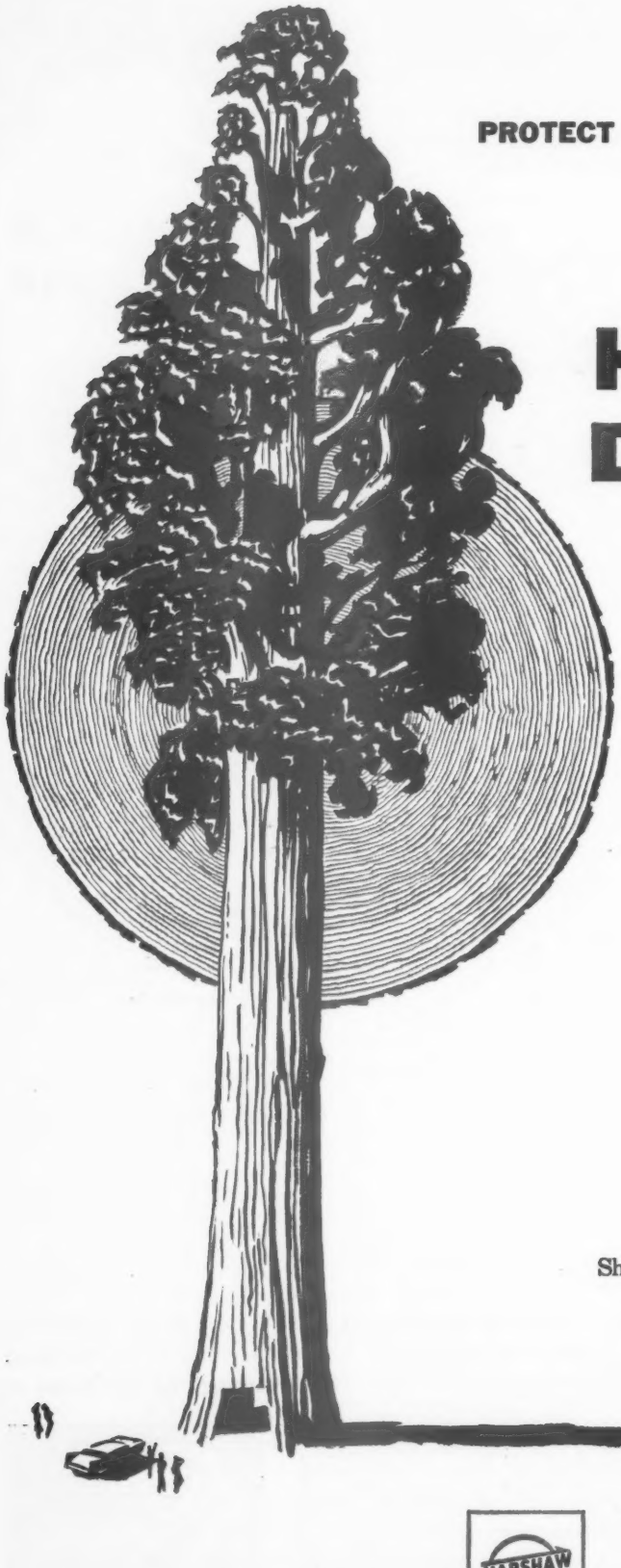

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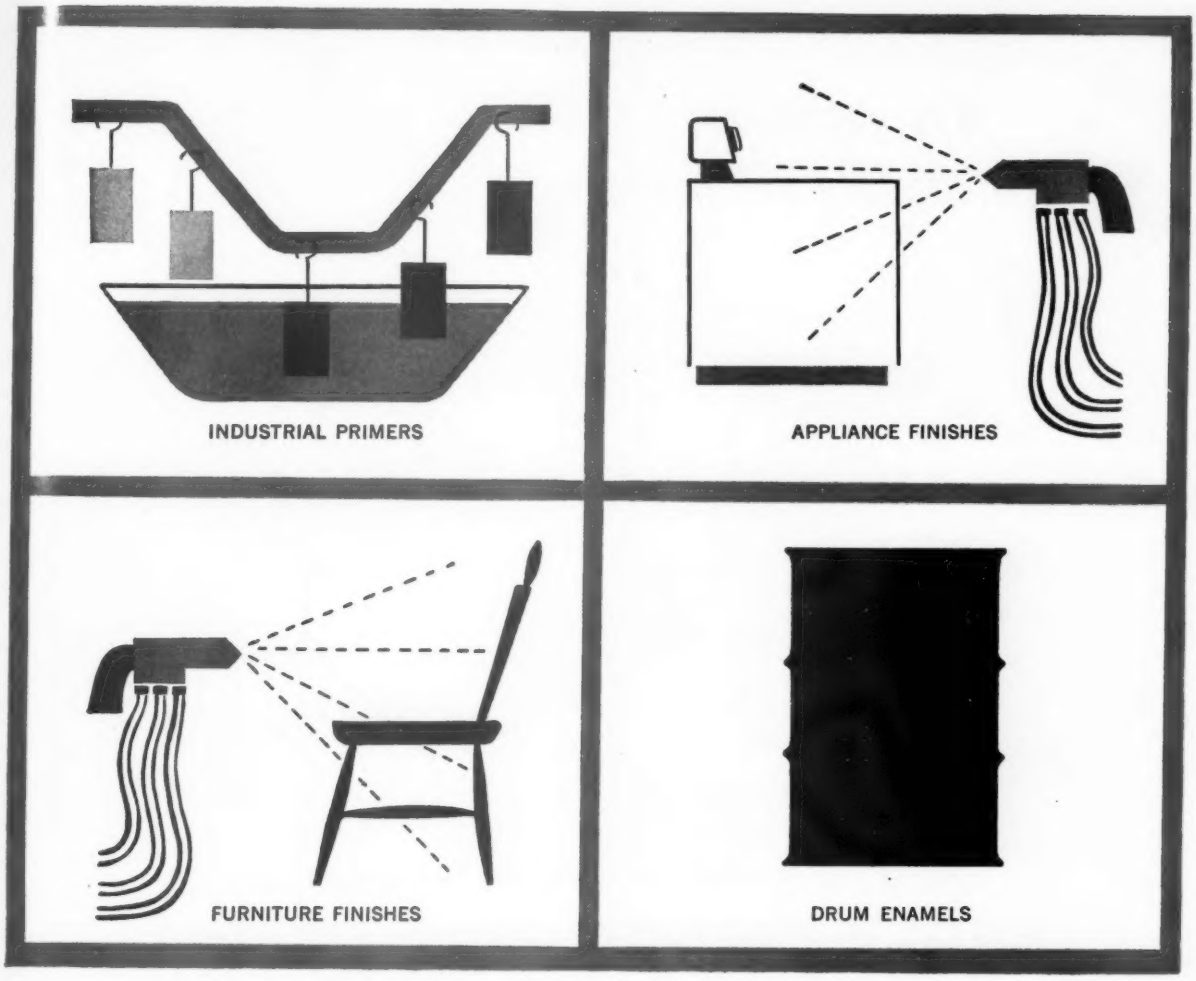

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An unusual combination of flexibility, toughness, adhesion, and compatibility sets UFORMITE® F-240 apart from traditional urea-formaldehyde resins. UFORMITE F-240 actually increases adhesion, film length, and toughness of baking coatings in which it is used.

In amine-alkyd baking enamels, UFORMITE F-240 allows higher levels of amine component than those permitted by conventional urea resins—i.e. a greater substitution of urea for alkyd without hurting the flexibility of the enamel film. Thus, your enamels can have more of the desirable properties contributed by aminoplast resins, such as resistance to food stains, alkali, and solvents. UFORMITE F-240 can also be used to harden oleoresinous varnishes, to impart print resistance to vinyl coatings, to improve flexibility and alkali resistance of coatings based on alcohol-soluble phenolic resins.

UFORMITE F-240 is compatible with an unusually broad variety of solvents and polymeric coating ingredients. It has the exceptional capacity to be thinned by both alcohols and aliphatic solvents such as mineral spirits.

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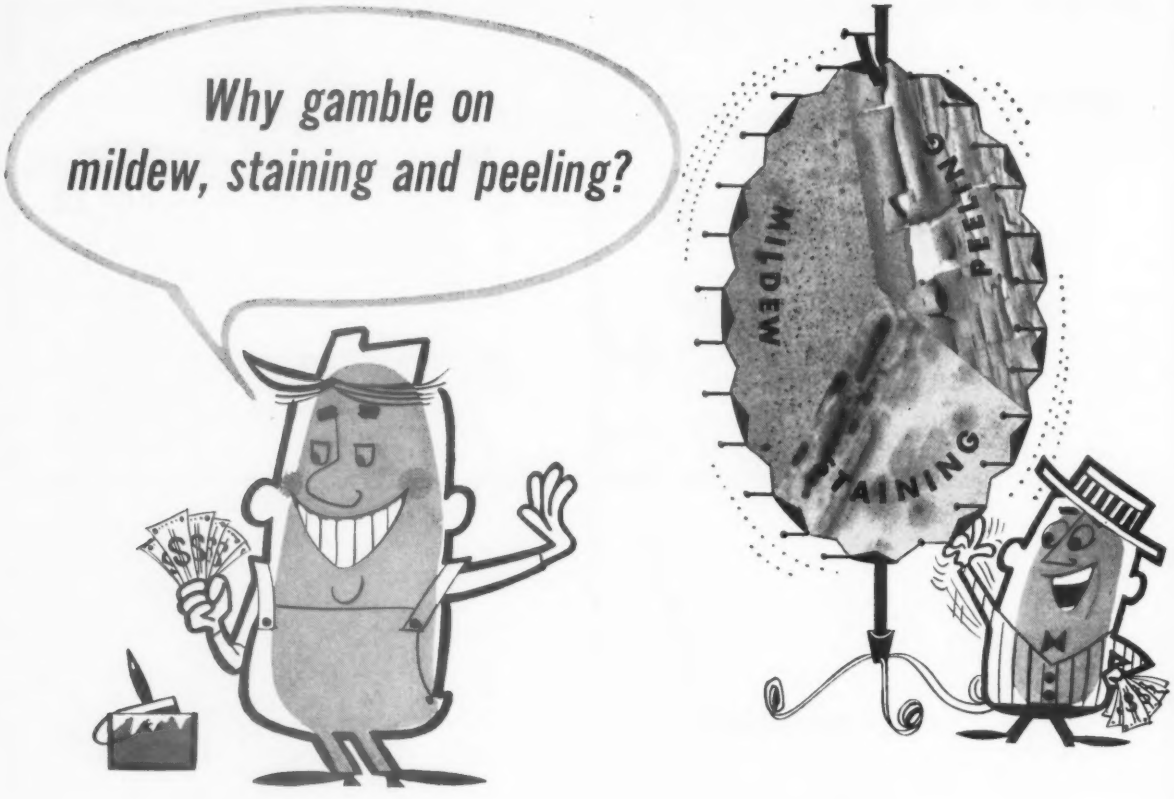

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Celanese trimethylolpropane—the ideal intermediate for producing alkyd resins—is now available at the lowest price in its history: *30.5¢ per pound.* That means you can get all the many advantages of trimethylolpropane—and save money at the same time.

Alkyd resins made with trimethylolpropane are characterized by excellent color and high solids at usual viscosity levels. The resultant pigmented coatings demonstrate high hardness and good flexibility, superior alkali resistance, and excellent color and gloss retention . . . even after weathering. Adhesion, impact resistance, and ability to withstand heat are also outstanding.

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X	98.5	<1	70-76	29-32	75-95	semi-fibrous	low oil demand; high PVC possible; low Ku range; for exterior paints.
3X	98.5	<1	76-81	37-41	120-140	fibrous	general purpose pigment for oil, oleoresinous, water emulsion interior and exterior paints.
FINE TEXTURE	99.5	1½-2	76-83	37-42	110-130	fibrous	slightly higher consistency than 3X; improved Hegman; for interior and exterior paints.
5X	97.5	<1	87-100	47-53	145-165	fibrous	high oil absorption; most fibrous Asbestine; higher consistency range, for exterior oil and water paints.
325	99.98	4-4½	75-81	37-41	90-120	semi-fibrous	"tailored"** talc; medium oil absorption and consistency; for oil and water paints.
425	99.99	5-5½	77-85	45-52	110-140	semi-fibrous	"tailored"** talc; medium/high oil demand; for industrial paints.
625	99.99	5½-6	125-140	65-72	190-240	platey	"tailored"** platey talc; highest oil absorption and consistency; imparts flatting; reduces gloss; for low sheen paints.

*Hegman obtained by hand mixing in linseed oil.
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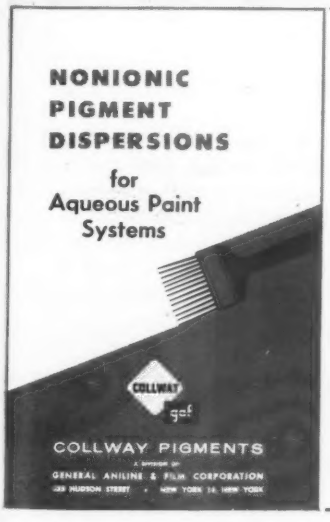

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These time-proved additives impart the anti-sag and flow control, pigment suspension, smooth brushability, controlled penetration, and can stability that insure optimum paint performance. Ask your Baker man today for the full story on THIXCIN R and M-P-A and, most important, their use in *your* formulation. Baker plants at Bayonne and Los Angeles, offices and warehouses in principal cities.

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THIS 2 YEAR TEST PROVES IT!

Three formulations of Masonry Paint were prepared as follows:

1. **A control formulation of the original paint.**
2. **A formulation with a 10% replacement of the original vehicle with Velsicol W-617 resin.**
3. **A formulation with a 25% replacement of the original vehicle with Velsicol W-617 resin.**

The masonry paints were applied to asbestos shingles in two coats. Two panels of each paint were placed on exposure in Florida and Ohio. After two years exposure in both locations the paints on all three panels are in excellent condition! These test panels were exposed to tropical sun, salt air, rain, snow, sub zero temperatures and the analysis of a cost accountant. The facts are apparent; Velsicol W-617 resins save money in masonry paint formulations without compromising quality.

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☐ Please send test samples of Velsicol W-617 Hydrocarbon Resins.
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Benefacation of
Paint Properties by

THIXOTROPIC VEHICLES

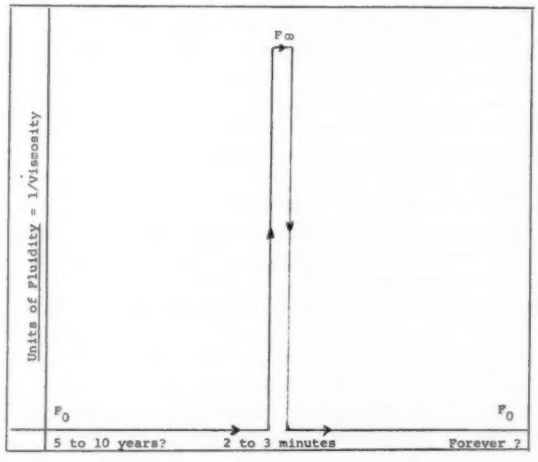
By
A. G. Hovey
and
T. R. Guevin

THERE are many values a paint system can have. Most of the values are obvious, but they are most conspicuous when the paint does *not* have them. Nothing becomes so famous as the batch of paint that will not dry.

One of the most valuable properties a paint can have is thixotropy. Some paints are to some degree thixotropic without intentional formulation to secure it. High viscosity improves pigment suspension and minimizes hard caking. Yet, at the moment of application, low viscosity is desirable for easy brushing or rolling and for perfect levelling. As soon as the film has been applied and the surface irregularities are smoothed out, there again appears the need for high viscosity. The prompt recovery of high viscosity gives not only sag control, but at the same time keeps the brush handle clean and free from the rundown characteristic of a thin paint. Thus, it permits thicker one-coat applications without sag. These points show the only time fluidity is desirable is at the time of application. (Figure 1).

Webster defines thixotropy as "the property or phenomenon exhibited by some gels of becoming fluid when shaken, the change being reversible". The colloid scientists frequently encountered the phenomenon of the ability of certain suspensions to lose part of their consistency when agitated and to regain the original consistency when allowed to rest. This was known a number of years before it was given a name. In 1927, Peterfi,[1] with the agreement of Freundlich,[2] called it "thixotropy", the word meaning "to change by touch".

Practical formulators of paint were groping about to build good thixotropic body into paint long before the phenomenon of thixotropy was even recognized. The retardation of pigment settling and hard packing was aided by use of suspending pigments or flocculating agents and by use of certain well-known metallic soaps. Thus, the practical attainment of some of the benefits of thixotropy were even partially gained at an early date, either by judicious pigmentation, or by use of additives which are partially soluble and partially insoluble in the vehicle, or by resort to both expedients. Unfortunately, as often as not, some good property such as the slowing of pigment settling might be gained only with the appearance of some undesirable property such as poor level-out, loss of gloss, ropiness, or reduced durability. Yet, every once in a while, a standard batch of a standard item would suddenly develop "queer" properties which made the paint appear very abnormal and frightening, but it would stir up and brush out just as well as the normal product. To the formulator's discomfort many would say, "This stuff is better than the usual!" Can't you always make it this way?" When the formulator sought aid from



IDEALIZED FLUIDITY IN THE LIFE OF A PAINT

Figure 1

The authors are associated with Olin Mathieson Chemical Corp., Chemicals Div., New Haven, Conn.

the consultant expert, the latter would knowingly, with a wink of the eye, say, "That's thixotropy", but he couldn't explain or tell you how to repeat the batch. Then it was that paint formulators turned for help to the new schools of rheology and colloidal phenomena. In the past decade there have become available in abundance scientific papers on thixotropy in paints and particularly on paint vehicles.

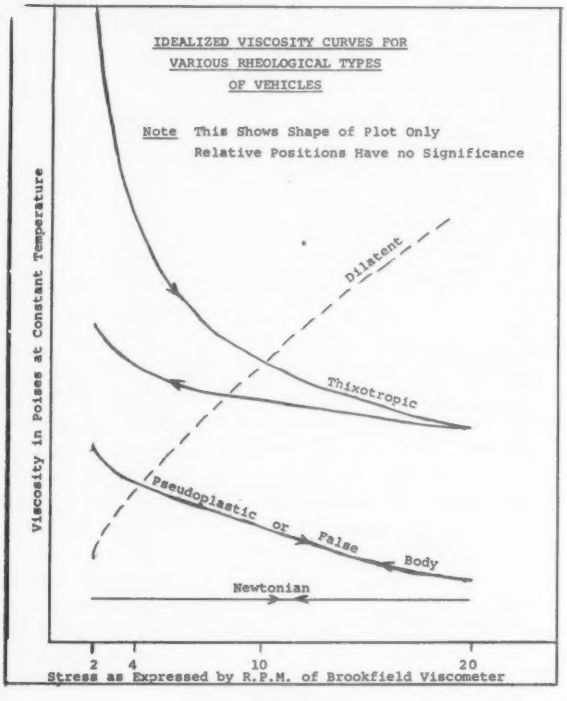


Figure 2

Theoretical

Thixotropic suspensions in paints and printing inks are almost invariably found to possess a flocculated structure. Particle alignment or orientation is probably the necessary condition. Where thixotropy exists in the vehicle without pigmentation, it is probably that the phenomenon is caused by the formation of bridges between molecular chains. The magnitude of the force of orientation appears to be very important. It must be neither too large nor too small. Thixotropy tends to exist when a structure is so constituted that when broken down it can rebuild itself if not prevented from doing so by externally applied forces. In brief summation, according to Green and Weltman[3], thixotropy is pictured as a delicate balance of the forces involved: "It requires energy to overcome the structural resistance of flocculation. It requires energy to break thixotropic structure and to maintain the broken down state. It requires energy to enforce particle alignment".

"False body" or pseudoplasticity, is often confused with thixotropy. In pseudoplasticity, an applied shearing force produces a change from a disorganized particle or molecular arrangement to one of particle alignment with the long axis turned in the direction of flow. Since the particles are not joined together, this realignment does not constitute a structural break down. When the shearing force is removed, no build up time is required for the particles to return to their original disorganized state.

In true thixotropy, there is an actual break down in structure, which takes place when a shearing force is applied. On removal of that force, the structure begins to rebuild, but the complete reconstruction of rigid structure might require hours or even days. This time lag of viscosity recovery results in two consistency curves instead of one. The curve of increasing stress (or R.P.M. of a rotational viscometer) and the return curve of decreasing stress will be a consistency curve in the form of a loop. Many of these will be shown later.

Dilatency (or rheopexy) is the opposite of thixotropy. This is the type of structural change where the consistency becomes greater upon application of stress and return to the lower levels as the stress is relaxed. Whereas thixotropy is of immense value to paint formulations, dilatency has no value and is even objectionable. Idealized viscosity curves for various rheological types are presented (Figure 2).

It has been proposed[4] that general reactions occur between polyamides and alkyds in fusion cooks (amide and ester interchange reactions) which split the polyamide chains and attach the residues to the alkyd units. Further reaction breaks these chains down and distributes the amide groups more evenly through the alkyd units. This proposal assumes that the reaction proceeds by way of the free acid groups on the alkyd and free amine groups of the polyamide.

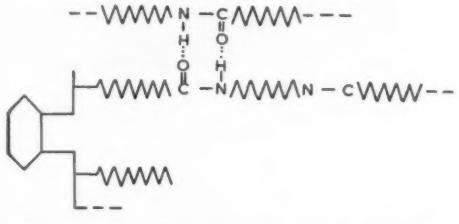


Figure 3. Idealized unit of thixotropic polyamide-alkyd system.

It has also been proposed[4,5] that the thixotropic behavior of polyamide alkyd systems is due to the hydrogen bonding of the nitrogen atoms in the polyamide chains. These hydrogen bonds produce a weakly bonded cross-linked structure which is easily broken up by agitation and shear. The cross-linked structure begins to reform when the polyamide alkyd system is released from stress. As more and more cross-linking occurs, migration is slower and slower, so the full recovery is somewhat delayed. This very probable explanation meets the conditions that the force or orientation must be neither too large nor too small.

An idealized unit of a thixotropic polyamide-alkyd system can be shown according to A. G. North (Figure 3)[4]:

Similar structures could be visualized for other vehicles based on drying oil esters and varnishes as well as for the alkyds.

Problems of the Vehicle Manufacturer

Thixotropy has been very beneficial at the paint formulation stage, particularly where the effort has been directed towards pre-treatment of the vehicle.

When benefit has been secured for one paint system and its vehicle, a number of questions arise. First, if the benefit is worthwhile on one, why should it not be beneficial for many? Second, since many vehicles are purchased instead of "home-made", who not pass this problem back to the vehicle manufacturer? Third, should not a vehicle manufacturer be able to impart thixotropy to standard vehicles much more efficiently and economically than this can be done with the home-made type on a small scale? Finally, should not the vehicle be the same in all respects except with the added benefit of thixotropy—even to the price?

The problems of the vehicle manufacturer when confronted with requests for thixotropic vehicles become highly complicated. Some might be obvious at once, such as the problems of extra inventory. Just as the color paste supplier is bedeviled with the problem that for every color there will be a small but insistent demand for that color in thousands of different vehicles, the vehicle manufacturer might easily be flooded with requests for his whole line of vehicles both with and without built-in thixotropy. Even if only one grade of thixotropic vehicle were involved, this alone would double the number of items to be handled.

The second difficulty is that of maintaining the same standard qualities and properties of the untreated vehicle. Usually paint vehicles are controlled to a definite viscosity and acid number. If the high temperature cook, whether fusion type or solvent azeotrope type, is prolonged to incorporate a polyamide, for example; there is bound to be an advancement of viscosity during this period. Or, to obviate this difficulty it would be necessary to outguess the batch on viscosity by stopping prematurely for the addition. It seems most prudent and logical to make sure of the uniformity of the vehicle such as an alkyd, by bringing it to the proper viscosity and acid number range and then thin it at once in the usual way before any thixotropic modification. When our Company discovered special new polyamide resins which would disperse in alkyd resins already completely made and dissolved in aliphatic spirits and impart a high degree of thixotropy to those vehicles by addition and dispersion in the 120-130°C. (248-266°F.) range, it appeared that something of value could be made available to the large-scale manufacturer. Quite early in test sampling, several large-scale vehicle manufacturers confirmed the value of being able to disperse the new polyamides in the vehicle thinning tank after the alkyd had properly been prepared and controlled, but yet conveniently utilizing some of the waste heat.

The third difficulty of the vehicle manufacturer is also a merchandising problem like the one of inventory, but this one is that of the physical handling of thixotropic vehicles. If they are treated by so high a concentration of polyamide that the product is no longer a pumpable or pourable liquid, when it reaches the customer's plant, practically all business that was formerly tank car would have to be converted to open-head drums and containers. The tax on materials handling systems would thus be almost prohibitive.

It is worthy to note that even the stiff, full-gelled thixotropic alkyds are completely remelted by warming back to 150°F. Since the necessary energy to break the weak forces of orientation is never very large, it never requires a great deal of heat or of mechanical work to break down even the stiff gels, no matter how great and fearsome a resemblance in appearance they may have to heat-irreversible gels (or "monkeys") which are held together by strong primary bonds.

Fortunately, the need for such a high degree of thixotropic gel appears to be limited only to very special cases since fully gelled, non-spilling paint itself is not in great demand. There seems to be good opportunity for volume production in thixotropic vehicles by employing only just enough polyamide to produce adequate thixotropic bodying in the paint, and still permitting easy transfer of the vehicles as liquids.

The only other difficulty in merchandising thixotropic paint vehicles is really the paint manufacturers' problem. This is to educate the user of the paint not to undo the improvements in the paint by adding more thinner.

Low Temperature Incorporation

The polyamides which have been successful in fusion cooks, as taught by Winkler,[5] have not, in general, been useable in alkyd resins which already have been dispersed in solvents. Olin Mathieson's special polyamide, "Omamid S," on the other hand, is very effective in producing a great variety of vehicles at temperatures only slightly above the softening point of "Omamid S."

There are two procedures which may be employed to impart thixotropy to a thinned vehicle. Both methods are basically the same, but differ in the point of addition of the "Omamid". One method is to add the polyamide resin to the thinning tank just after a batch has been cooked and thinned; the other is to incorporate the resin into a stock supply of thinned vehicle.

The addition of "Omamid" resin to the thinning tank, for the larger resin manufacturer, is the preferred manner. For best results the thinned vehicle should be adjusted to a suitable temperature (about 120°-150°C.) and the correct, predetermined amount of this polyamide resin charged into the tank. Mild agitation should be provided to insure complete homogeneity. Optimum dispersion is obtained in about 60-75 minutes. Time of dispersion is usually shorter at higher temperatures.

In the case where it is desirable to impart thixotropy to a stock thinned vehicle, it is only necessary to add the correct amount of the polyamide to the vehicle in a suitable vessel and heat in an inert atmosphere to 120°—150°C. for about one hour while providing mild agitation.

To illustrate the versatility of "Omamid S" in imparting thixotropy to a wide range of vehicles, it was added to a short oil alkyd, "Aroflat 3050 ML-40," a medium oil alkyd, "Aroplaz 1085-M-50," a long oil alkyd, "Beckosol P-470-70," and a bodied linseed oil, "Alinco Z-4." Other vehicles were used but these four are mentioned as being typical examples for illustration. All the vehicles were heated to 120°C. under a nitrogen atmosphere with mild agitation, the "Omamid S" added, and heat maintained for one hour before the dispersion was cooled. The hysteresis data shown was obtained 24 hours after the gel was cooled. It must be borne in mind that the strength of the gel increases with

age and so the results shown would be higher if the hysteresis data were obtained a week or a month later.

Short Oil Alkyds Gelled with Omamids

ADM's "Aroflat 3050 ML-40" was used as a typical short oil alkyd and a dispersion of 2.5% Omamid S was cooked into the vehicle in the manner previously described. The formulation is given.

GELLED SHORT OIL ALKYD

	Pounds	Galloffs
Aroflat 3050 ML-40	687.0	97.5
Omamid S	7.0	0.9
Odorless Mineral Spirits	10.4	1.6
	704.5	100.0

HYSTERESIS DATA

Brookfield:	2 RPM	20 RPM	2 RPM
Poises	690	150	520
Helipath Stand:		0.5 RPM	5 RPM
Poises		12,000	3,300

This is a good time to define what is meant when one refers to a certain percent "Omamid S." The percentages are the percent of "Omamid S" added to the vehicle solids. So, the amount of "Omamid S" is 1% of the total vehicle as supplied, the "Omamid S" is 2.5% of the vehicle solids. It is easier for the vehicle manufacturer to use this reference point when figuring the cost of the gelled thixotropic vehicle. The values in the hysteresis curve are obtained by a conventional Brookfield Viscometer, Model RVF which had speeds of 2, 4, 10 and 20 R.P.M. The data were taken by carefully placing the spindle in the gelled vehicle and starting the Brookfield Viscometer at the lowest speed and, after two minutes, taking the reading followed by increasing the speed to the next higher increment and revolving the spindle for 2 minutes, take the reading and increase the speed. This procedure was repeated until the 20 R.P.M. reading was recorded, then the speed was reduced in two-minute intervals taking readings each time. The data are plotted and the curve is shown (Figure 4). From experiences with thixotropic gelled vehicles, this is a typical example of a good thixotropic short oil alkyd vehicle. This statement cannot be appreciated until the thixotropic gelled vehicle has been formulated into a flat paint, which will be shown later.

The determination by instrumentation of the amount of thixotropy present in a gelled vehicle is one which has not been settled definitely. Some authors use a high shear Feranti-Shirley,[4] Interchemical,[3,6,7] or other rotational viscometers[8,9] and record the viscosity after a plateau has been reached at each spindle speed. This system has its drawbacks because, at the low spindle speeds where the values are more significant, there is a rapid change in the viscosity as the spindle revolves and the greatest change in viscosity with time is noted. When our work was started, the time interval of two minutes per spindle speed was arbitrarily chosen in an attempt to obtain uniformity. This method also has its failings, the main fault being that the first readings at low spindle speeds are constantly changing and, regardless, one must take the reading at two minutes each time to obtain uniformity.

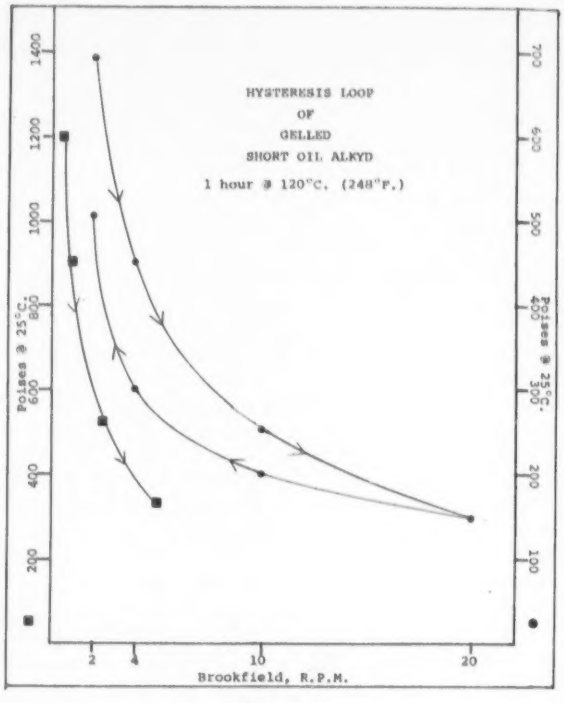
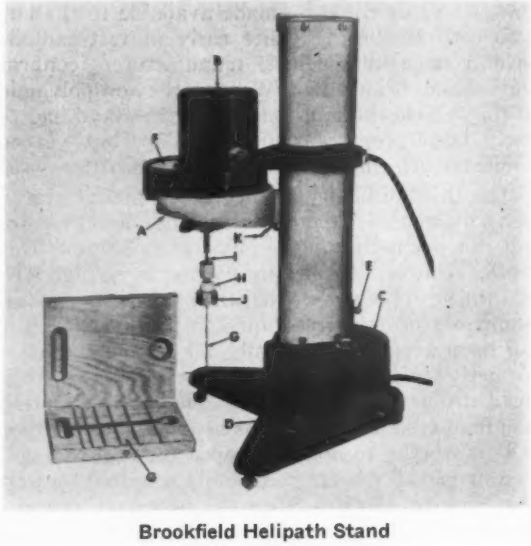


Figure 4

In many cases the dial needle does not appear in the window at exactly two minutes unless one carefully starts the instrument in the same place.

In our search for a better method for determining thixotropy in a gelled vehicle, the Brookfield Helipath Stand (Figure 5) was proposed as an instrument which would give reproducible results because of its unique feature, that of constantly being introduced into a fresh, undisturbed portion of the gelled vehicle. The special spindles can be placed in the special adapter and attached to any of the 9 models of the Brookfield Viscometer. The Helipath Stand generally lowers the Brookfield Viscometer at the rate of one inch per minute. With the pint can that was used in the lab, three readings could be obtained at 1 R.P.M. If the



Brookfield Helipath Stand

gel strength was uniform, identical readings were recorded for each pass of the dial indicator as the spindle traverses through the gelled vehicle. The values obtained via the Brookfield Helipath Stand are plotted (Figure 4) and contrasted with the values obtained using the conventional Brookfield Viscometer. The values of the gelled vehicle are higher because the readings reflect the viscosity of the gel with little breakdown of the gel.

The viscosity values of a gelled vehicle have little value unless they are translated into a paint system and evaluated for the various characteristics that a truly thixotropic paint should possess: sag resistance, anti-pigment settling, high initial viscosity, good brushability, etc. The above gelled thixotropic vehicle was incorporated into the flat paint whose pigmentation follows.

THIXOTROPIC WHITE ALKYD FLAT PAINT

	Lbs.	Gals.
Titanox RCHT	550.0	20.30
Snowflake Whiting	150.0	6.67
Gelled Alkyd Vehicle	346.0	49.20
Odorless Mineral Spirits	104.0	16.50
Amsco #460	67.0	9.90
24% Lead Naphthenate	2.0	0.21
6% Cobalt Naphthenate	1.0	0.13
Antiskinning Agent	1.0	0.13
	1,221.0	103.04

The Hysteresis data were determined (Figure 6). The brush outs demonstrated the anti-sag characteristic as well as the good level out of the brushmarks. This paint system was the formulation first shown at the Paint Industries Show of 1959 in which many saw the spatulas dipping into a gelled flat paint contrasted with a similar paint not gelled with "Omamid."

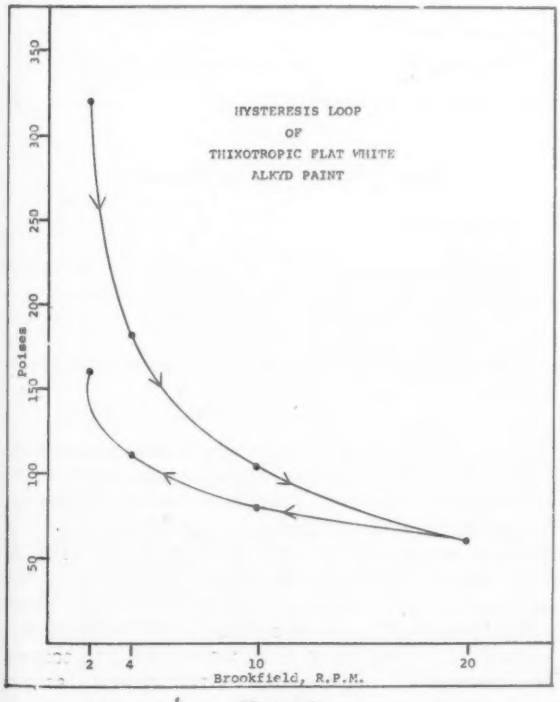


Figure 6

Medium Oil Alkyd Gelled with "Omamid S"

ADM's "Aroplaz 1085-M-50" was the typical medium oil alkyd used and a dispersion of 4% "Omamid S" cooked for one hour at 120°C. was observed to give an ideal level of thixotropy when pigmented. The formulation for the gelled vehicle is given and its hysteresis data plotted (Figure 7).

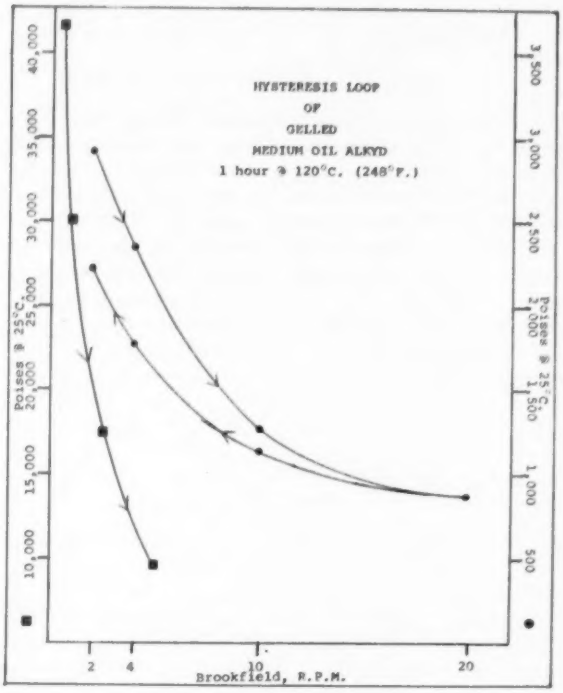


Figure 7

GELLED MEDIUM OIL ALKYD

	Pounds	Gallons
Aroplaz 1085 M-50	725.0	95.4
Omamid S	17.6	2.2
Mineral Spirits	17.6	2.4
	790.2	100.0

HYSTERESIS DATA

Brookfield:	2 RPM	20 RPM	2 RPM
Poises	3,400	320	1,100
Helipath Stand:		0.5 RPM	2 RPM
Poises		41,500	9,800

The observation has been noted that not all vehicles act the same way, just as there is some degree of uncertainty in the manufacture of alkyds. "Omamid S" gives a different gel structure when there are different alkyds used. In the alkyds, the polyols, oil, solvent, and dibasic acids modify alkyds in various manners. So, "Omamid" can react with alkyds in different ways to give different gel structures. There was no set pattern shown by our preliminary studies and the trail and error method was necessary. Generally speaking, however, a level of 2 to 5% "Omamid S" based on the vehicle solids was found to give adequate gel structure for the preparation of good thixotropic paints.

The above vehicle was pigmented to produce a semi-gloss thixotropic paint.

THIXOTROPIC SEMI-GLOSS ENAMEL

	Lbs.	Gals.
Titanox RCHT	375.0	12.92
Titanox AMO	100.0	3.08
Kadox 515	100.0	2.13
Nytal 300	75.0	4.20
Gelled Alkyd Vehicle	492.0	64.89
Mineral Spirits	81.0	12.50
6% Cobalt Naphthenate	2.0	0.25
24% Lead Naphthenate	.9	0.51
Antiskinning Agent	0.5	0.07
	1,230.4	100.55

The hysteresis curve is presented (Figure 8). The brush out chart demonstrated good sag resistance, and level out of brush marks. Brushability cannot be easily demonstrated but the viscosity characteristics of paint (Figure 8) shows that this paint should have good brushability. This was not true for all the vehicles tried. The level of concentration of Omamid becomes more important when dealing with semi-gloss and gloss paints because the vehicle becomes more of the dominant material in the formulated paint.

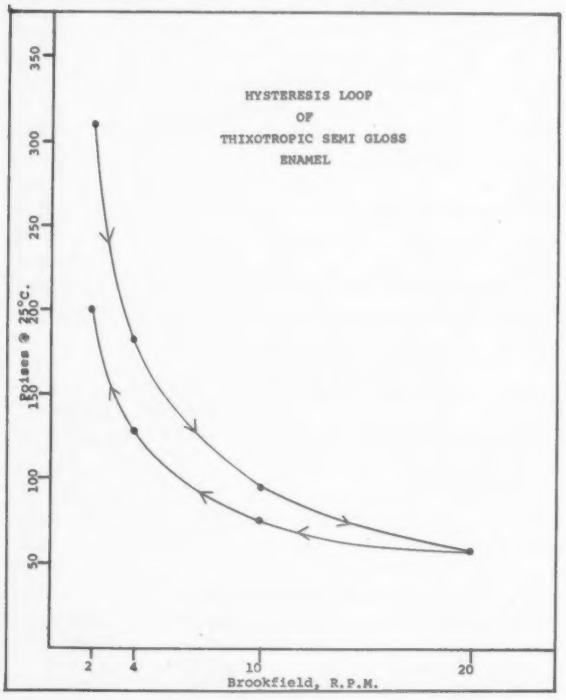


Figure 8

Long Oil Alkyd Gelled with "Omamid S"

The long oil alkyd and the medium oil alkyd are the more important groups of alkyds to be gelled with "Omamid" because they are used in the formulation of semi-gloss and gloss enamels which rely on the viscosity of the vehicle, to a great extent, to give body to the paint. This is very much the case in gloss paint systems in which approximately 75% of the paint is vehicle. It is in a gloss paint that the gelled vehicle is given the ultimate test.

RCI's "Beckosol P-470-70" was used as a typical long oil alkyd. The ideal level of "Omamid" was 3% based on the vehicle non-volatile for the pigment formulation. The vehicle formulation appears below.

GELLED LONG OIL ALKYD

	Pounds	Gallons
Beckosol P-470-70	752.0	94.6
Omamid S	16.0	2.0
Mineral Spirits	21.1	3.4
	790.1	100.0

HYSTERESIS DATA

Brookfield:	2 RPM	20 RPM	2 RPM
Poises	3,200	780	1,300
Helipath Stand:		0.5 RPM	5 RPM
Poises		55,000	13,700

The hysteresis data were plotted in (Figure 9). This gelled vehicle was pigmented into a gloss paint.

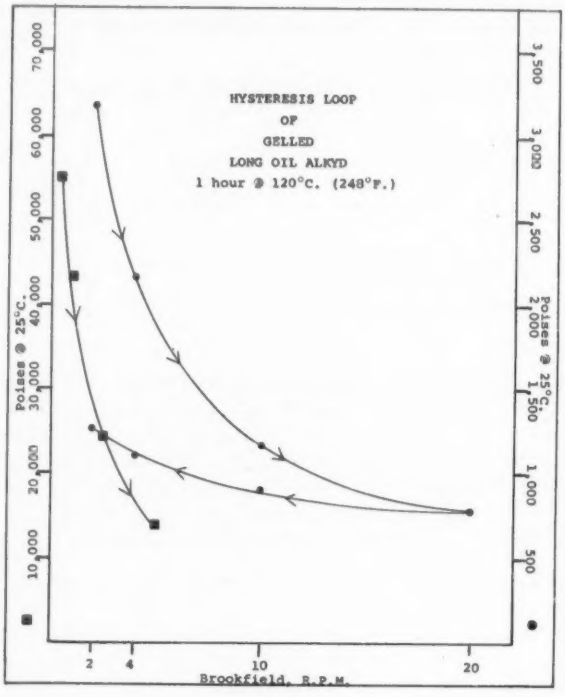


Figure 9

THIXOTROPIC GLOSS ENAMEL

	Lbs.	Gals.
Titanox RA-50	277.0	7.92
Kadox 15	31.0	0.66
Gelled Alkyd Vehicle	538.0	68.20
Mineral Spirits	147.1	22.60
5% Calcium Naphthenate	4.0	0.48
6% Cobalt Naphthenate	2.5	0.31
Antiskinning Agent	1.0	0.13
	1,000.6	100.30

The hysteresis data of this gloss paint has been plotted (Figure 10). This thixotropic gloss paint seems to be an ideal gelled system. There is no loss of gloss when "Omamid" is incorporated into the vehicle, there is excellent sag resistance, and there is good level out. With some of the long oil alkyds and some of the medium oil alkyds, there was noted a loss in the gloss, as much as 10-20%, as measured on the Gardner Reflectometer. Conditions have to be varied to correct this irregularity. This condition only appears, as one might easily suspect, in the gloss paint system.

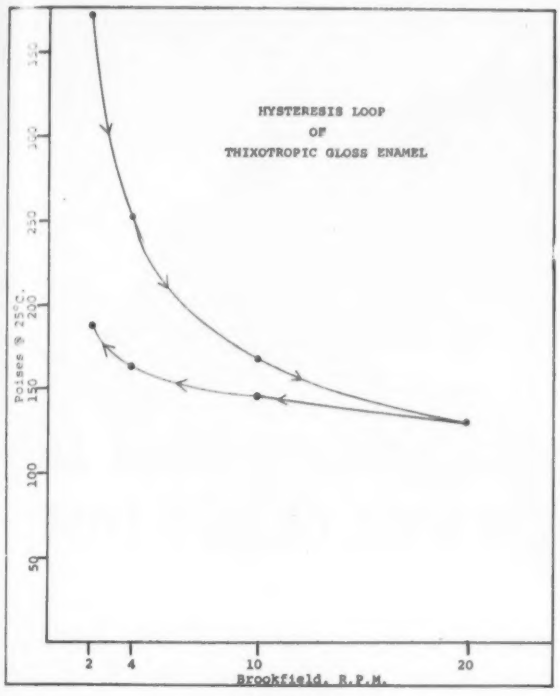


Figure 10

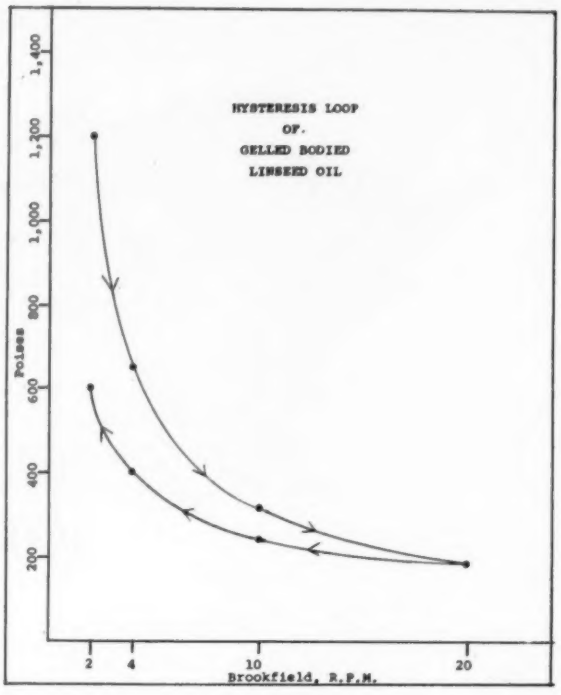


Figure 11

"Omamid S" Gelled Bodied Linseed Oil

All the alkyds discussed previously, have had soybean oil in their formulation as an alkyd. Other oils can be used, and a bodied linseed oil, ADM's Alinco Z-4 was used as a typical example. The bodied oil was treated with 5% Omamids for one hour at 120°C. to produce a thixotropic gelled vehicle.

GELLED BODIED LINSEED OIL

	Pounds	Gallons
Alinco Z-4	760	95.0
Omamid S	40	5.0
	800	100.0

HYSTERESIS DATA

Brookfield:	2 RPM	20 RPM	2 RPM
Poises	1,200	196	600

The hysteresis data are plotted (Figure 11), and the gelled vehicle formulated into a typical outside house paint.

THIXOTROPIC EXTERIOR WHITE HOUSE PAINT

	Lbs.	Gals.
Titanox RANC	40.0	1.15
Titanox AMO	160.0	4.93
35% Leaded Zinc Oxide	400.0	8.16
Nytal 300	250.0	10.54
Gelled Bodied Linseed Oil	144.0	18.00
Raw Linseed Oil	266.0	34.300
Mineral Spirits	141.0	21.5
24% Lead Naphthenate	7.0	0.73
6% Manganese Naphthenate	2.0	0.25
Antiskinning Agent	1.0	0.13
	1,411.0	99.69

The hysteresis data are presented (Figure 12). This paint exhibits good brushability. The level out and sag resistance is good. The paints containing "Omamid S" have been put through Weather-O-Meter tests and have shown no adverse effects due to the "Omamid" present in the vehicle. The paints show no sign of failure after 500 hours of testing.

(*Turn to page 97*)

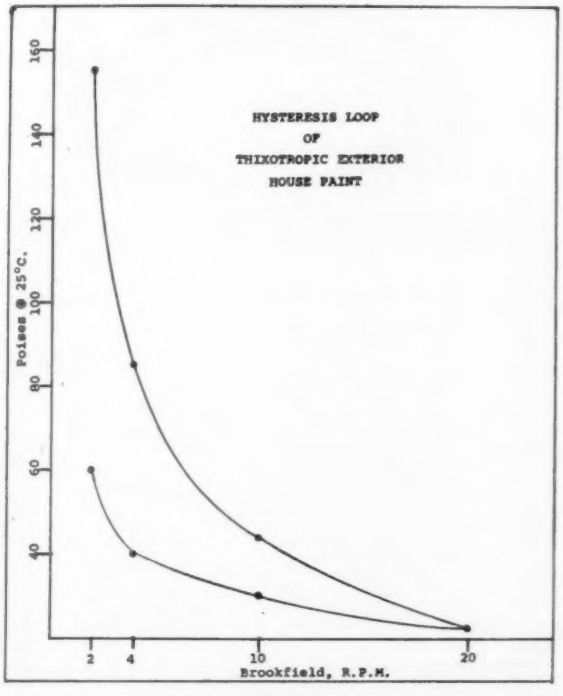


Figure 12

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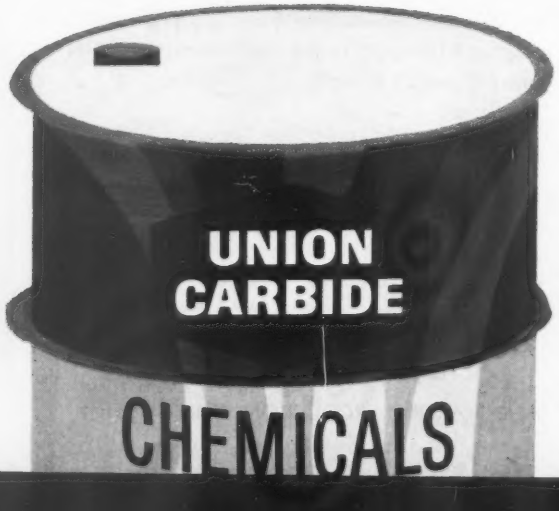

BLISTERING OF PAINTED STEEL

Part III
(conclusion)

Theory and explanation of the various processes associated with the deterioration of painted steel.

By
J. A. W. Van Laar*

Influence of the Paint Coat on the Rusting of Steel and on the Formation of Atomic Hydrogen

The development of atomic hydrogen under corrosion conditions is a well-known fact[2), 3), 4)] but it was questionable how this would be influenced by the conditions described in this paper: painting and lacquering of steel, fresh water immersion test, and electrolysis.

Various apparatus of the type shown in Fig. 30 are used; consisting of a sealed glass tube, connected with a steel tube with a flat circular 1 mm sheet steel box at the end. The total volume of the apparatus is about 20 cc, the sheet steel surface about 70 cm^2. All apparatus are evacuated and the steel portion of a number of them are then coated with a corrosion resistant paint system, consisting of a wash primer with a clear epoxy-urea resin lacquer.

Both the bare and the coated apparatus are either placed in the fresh water immersion test or connected electrically, as an anode or as a cathode under conditions similar to the electrolysis experiment. The current was about 100 mA with an unpainted surface, and below 0.1 mA for a painted one. The gas contents are then analysed. Blank tests are run also. Results were taken after times, varying between 1 and 12 days and are *summarized* in Table 2. The coating prevented rusting in water and in alkali electrolysis. In addition to presence of excess H_2 a little H_2O, N_2, CO, CO_2 and CH_4 is always present but will be neglected here.

When the apparatus shown in Fig. 30 is placed unconnected into the fresh water immersion test, the pressure after 5 days is 20 times as large in the apparatus without coating as compared with those bearing the coating mentioned. In the first case, the pressure is of the order of magnitude of 1 mm mercury after 5 days.

Electrolysis of 0.1% NaOH provides for an increase of a factor 4 for the cathodic coated metal, compared with the same sample subjected unconnected to the fresh water immersion test, and a decrease to less than half the value of the same for anodic connection.

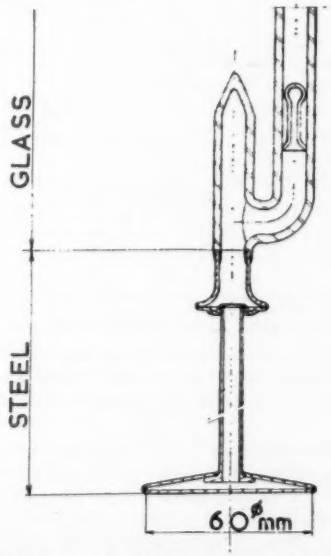

Figure 30. Apparatus for determining atomic hydrogen, after diffusing through the steel and recombining at the Dia side of the panel.

No tests were made with the apparatus unconnected in the alkali solution. For uncoated samples, the values for cathodic and anodic connection, compared with the fresh water immersion test are 20 : 1 : 1 proportionately. It appears that

*N. V. Philips' Gloeilampenfabriken, Eindhoven, Netherlands.

under the conditions mentioned the coating system applied causes a considerable diminishing of hydrogen development on the inside of the steel box. This reducing effect is likely to be brought about by a paint coat of reasonable quality including the paints and lacquers dealt earlier in Part I. The coating also neutralizes to a great extent the effect of the electrolysis.

Conclusions

1. The experiments described constitute proof for the development of hydrogen under the conditions mentioned earlier, and for the fact that a paint coat can diminish this development to a great extent. It is generally know, that the hydrogen can pass through the steel only in the atomic state and therefore it must be *atomic hydrogen* that coincides with the Dia Phenomenon.
2. Spontaneous corrosion gives a hydrogen pressure increase of 1/5 mm Hg a day in the apparatus of Fig. 30 i.e. $8x10^{-5}$ cm^3/cm^2 a day H_2 corresponding with $3.3x10^{-9}$ mol/cm^2/day. Assuming equivalence between the amount of hydrogen and oxidized iron, this would account for $3x10^{-4}$ mg Fe $(OH)_2/cm^2$/day, to be present outside or inside. With *electrolysis* the increase was 20 times as much, i.e. $2x10^{+3}/cm^3/cm^2$/day H_2i.e. 7.10^{+8}mol H_2 equivalent with $6x10^{-3}$ mg $Fe(OH)_2$ cm^2/day, inside. This might be checked. Suppose the current density is 1.5 mA/cm^2, then this corresponds with $7x10^{-4}$ mol H_2/cm^2/day.

   This means, that only 1/10,000th part of the hydrogen generated by the electrical current emerges at the back of the steel. The current density is of the same order of magnitude in the electrolysis experiments described in Parts I and II. (July and September issues)
3. The proportions of the speeds with which the Dia Phenomenon develops in the fresh water immersion test and in the electrolysis experiment can be understood from Table 2.

TABLE *2*

Hydrogen Pressure after 5 days' Exposure of Apparatus shown in Fig. 30. Values have semi-quantitative significance only.

TEST	Hydrogen Pressure 10^{-3}mm Hg.
Fresh Water Immersion Test (pure water, 40°C, aerated)	
Coated sample	50
Uncoated sample	1000
Electrolysis test (6 Volt, 0.1% NaOH, 40°C)	
Cathodic sample, coated	300
Anodic " , coated	20
Cathodic " , uncoated	20000
Anodic " , uncoated	1000

Electric Potential Measurements on the Dia Side

Apart from the temporary development of blisters on the Dia side of the bare metal at the beginning of the experiments described in Part I, the Dia Phenomenon may briefly be summarized as follows:

The corrosion at the bare parts of the steel gives rise to the formation of atomic hydrogen, which diffuses through the steel. When emerging, the presence of atomic hydrogen results in suppression of blisters and stimulation of corrosion.

All of these phenomena suggest that the atomic hydrogen gives rise to an anodic potential of the steel surface under the coating at the Dia Side.

In order to make this conclusion understandable, it seems appropriate to enunciate very briefly a few principles of electrochemistry, as far as we are concerned with them here.

Electrochemical Theory of Corrosion.

A part of electrically insulated iron exposed to pure aerated water will not show the same reactions at different parts of its surface.

Anodic Processes:

For reasons of structure and composition, at certain so-called *anodic* parts the iron is more apt to go into solution than at other parts. The elementary primary corrosion reaction is:

$$Fe \rightarrow Fe^{++} + 2\,e \qquad (1)$$

The iron is transferred from the metallic into the ionic state, and the remaining metal acquires a negative portential. This reaction is followed by others, which may be represented as follows:

$$2\,Fe^{++} + 4\,OH \rightarrow 2\,Fe(OH)_2 \qquad (2)$$

$$2\,Fe(OH)_2 + \tfrac{1}{2}\,O_2 + H_2O \rightarrow 2\,Fe(OH)_3\downarrow \qquad (3)$$

$$4\,H_2O \rightleftharpoons 4\,OH^- + 4H^+ \qquad (4)$$

$$2\,Fe^{++} + \tfrac{1}{2}\,O_2 + 5\,H_2O \rightarrow 2\,Fe(OH)_3\downarrow + 4\,H^+ \qquad (5)$$

This is the secondary anodic reaction, resulting in the reduction of oxygen diffusing from the bulk of the liquid, in the precipitation of ferric hydroxide and in the formation of an increase of H^+ions. These ions create a more positive potential in the liquid at the anodic parts of the surface (*polarization*) and have a certain tendency to diffuse away from these parts. The diffusion processes of O_2 and H^+ions and the permeability of the rest determine the speed of these anodic reactions.

Cathodic Processes

At other parts of the surface the metal is less prone to send ions into solution. Here the negative charge (equation (1)) of the equipotential metal will exert the cathodic reactions:

$$2\,H^+ + 2\,e \rightarrow 2\,H \text{ (atomic hydrogen)} \qquad (6)$$

$$2\,H \rightarrow H_2 \qquad (7)$$

Generally the reaction (7) will not proceed, due to the overvoltage of H_2 which is not overcome by the potential brought about by (1). The atomic hydrogen, generated according to (6) will diffuse partly into the metal, partly into the liquid and partly create a counterpotential, by which the cathodic processes are determinated or even stopped. This is the cathodic polarization. In the presence of oxygen however, hydrogen is oxidized and the cathodic reactions proceed:

$$2\,H + \tfrac{1}{2}\,O_2 \rightarrow H_2O \qquad (8)$$

Oxygen is thus acting as a depolarizer.

Direct reduction of the oxygen is an alternative:

$$\tfrac{1}{2}\,O_2 + H_2O + 2e \rightarrow 2\,OH^- \qquad (9)$$

These processes are determined in their proportions by the pH. A neutral liquid (our case) is less favorable than an acid one. A certain excess of OH^+-ions will result at the *cathodic spots* from (6) and (9) giving a *more negative potential locally.*

Resuming we see that an unconnected piece of iron in pure aerated water naturally has so-called anodic and cathodic spots. Anodicity means that iron is transferred into ferric hydroxide. Here the potential of the liquid is increased, thus becoming an anodic potential.

Cathodicity means that wherever iron is less reactive, the negative charge of the metal supplied by the anodic reaction gives reduction of H^+-ions to hydrogen and reduction of oxygen to water.

Anodic and cathodic processes are dependent on each other, compare (5) and (6). Oxygen is always necessary as far as pure water is concerned.

Electric Potential and Corrosion Measurements at the Dia Side

We shall now describe two kinds of experiments, showing that as was originally assumed, the steel at the Dia Side is of an anodic potential and is liable to corrosion.

Potential Measurements at Dia Side

The supposition has been confirmed by measuring the potential in the test arrangement shown in Figure 31.

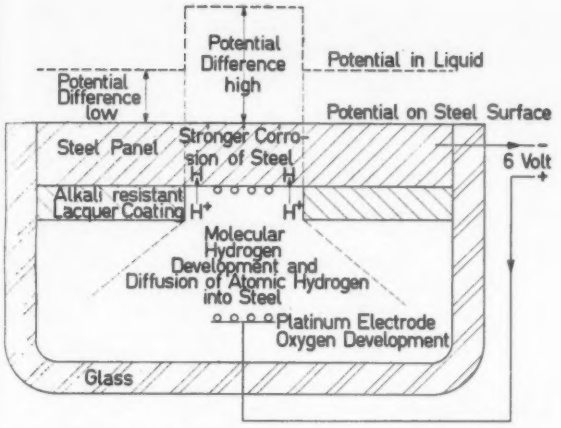

Figure 31. Potential in electrolysis experiment.

The left-hand dessicator lid is taken off and the apparatus turned 90° clockwise so that the electrolysis cell is now under the steel panel C which is in the horizontal position.

The electrolysis cell side of the panel is coated as before, the top side is not coated at all. The panel is connected as a cathode, so that hydrogen is developed at the bare spots of the bottom.

Measurements are taken now with the Philips pH-Meter No. PR 9400.

Two saturated KCl calomel electrodes, ending at the bottom in a porous channel 1 mm wide, are placed on the Dia side of the bare spot and of the covered spot respectively, and the potential difference is measured.

Thus it was found inadvisable not to measure the potential at the surface of the swollen paint film, since the potential drop through the film may affect the true reading. Moreover, the wet film coated panel is difficult to manage. The swollen film constitutes a capillary system containing a certain amount of water of limited mobility with oxygen being dissolved in the water.

The connection of the metal with the porous end of the calomel electrode is brought about by a saturated solution of $FeCl_2$ or $FeSO_4$ or a paste made of the salt of the solution with vaseline or paraffin oil. The potential of the calomel electrode at the Dia spot is always higher but differences vary strongly, ranging from 10—150 mV.

The metal is then covered with filter-paper, moistened with a 0.1% NaCl solution, simulating a swollen film with increased conductivity and corrosion stimulant.

The potential difference then amounts to 120-240 mV, the liquid at the Dia spot of the bare parts being always more positive. With dry paper, moistened somewhat by the slightly leaking through KCl solution, about 40 mV is found.

Corrosion at Dia Side.

A kind of Corrosion Dia Phenomenon was observed as follows. If electrolysis is interrupted for one night, the wet filter paper after half an hour has not changed its appearance. After electrolysis is resumed, a fresh paper does not show a difference after 15 min. But 30 min. after electrolysis has begun, a fresh paper then applied shows after another 25 min. a brownish pattern of the bare spots at the back of the panel. After 70 min. of electrolysis in total, only 15 min. more are needed for discoloration of another fresh paper. The color pattern is such, that the corrosion at the Dia side of the bare spot is shown to be stronger than at the Dia side of the covered parts. (Fig. 31).

We see then that atomic hydrogen is capable of giving an anodic potential and of promoting corrosion at only part of the surface at which it emerges from the steel. The phenomenon is present within an hour, after electrolysis at the other side of the metal has been initiated.

Discussion of Results and Conclusions

Let us sum up the results of our investigation with the partly painted steel panel as an object. The Dia Phenomenon consists in a change of blistering and a stimulation of rusting under a paint or lacquer film.

The Blister Dia Phenomenon has the following aspects:

1. Suppression of blistering at the Dia side of the bare spots.
2. Preferential blistering along the Dia side of the bare spots.
3. Preferential blistering along the bare spots.
4. Preferential blistering on the Dia side of the bare spots.

The Corrosion Dia Phenomenon consists of:

1. Preferential rusting at Dia side of bare spots.
2. Preferential rusting at zones of bare spots.

In Part I, various ways in which the Dia Phenomenon can occur resulting in spontaneous corrosion of painted steel are discussed. It was also shown in Part II that the Dia Phenomenon can be induced by electrolysis.

We have just seen that both corrosion and electrolysis can generate hydrogen which penetrates the steel and emerges at the other side, indicating that atomic hydrogen as the agent which causes the effects mentioned at the back of the panel of the Dia side where bare spots appear.

However, the question has not yet been answered, why atomic hydrogen at the back of the panel induced corrosion and suppressed blisters, to mention only the most striking and generally occurring phenomena.

Furthermore, why is it that all the phenomena mentioned do not occur in the same degree of intensity and if not, what is it, that causes this variance in intensity.

Let us consider the first question.

An indication for the kind of relation between the atomic hydrogen and the Dia Phenomenon is the fact that as has been shown experimentally; the atomic hydrogen produces a higher potential in the liquid at the back of the bare spot where it is generated. This means that at these spots the metal is of a lower potential. With respect to the liquid, this is in accordance with a stronger tendency to corrode, found with filterpaper, moistened with 0.1% NaCl solution.

The lower potential of the metal has already been explained by Fischer and Heiling[4] who electrolyse i.a. normal solutions of HCl and H_2SO_4 in an array that does not fundamentally differ from our earlier investigations.

The measurements are made with two salt bridges each on one side of the metal in the adjacent liquid. The metal was always the other electrode. The liquid was the same on both sides of the metal. The metal was found to become less noble at the non-electrolysis side. Because of the *acidity of the solution* the corrosion stimulation of course could not have been observed.

Fischer and Heiling explain the less noble potential of the metal from the hydrogen over-tension phenomenon. Thus, the equilibrium potential is more negative when the atomic hydrogen generated at one side of the iron diffuses through it and assembles at the other side, being able to recombine only at a lower voltage than expected.

This however does not help us to explain why the atomic hydrogen stimulates corrosion in a neutral environment while it would be expected to act as a reducing agent. Therefore we suggest that this corrosion stimulation action is due to differential aeration. The atomic hydrogen, after having reached the surface of the steel at the Dia side, will react with the oxygen present in the coating film at the metal surface. This oxygen is dissolved in the water with which the film is swollen.

Because of the local reaction of the atomic hydrogen with the oxygen, the concentration of the latter will be lowered, thus creating the conditions for a differential aeration corrosion. This is the well-known case in which a piece of iron

when in contact with a watery liquid of different oxygen concentration corrodes mostly where this concentration is lowest; in other words in this case the metal becomes *anodic*[5]

Starting from this conception we can now understand that the Dia side of the bare parts of the corroding painted steel must be *anodic* too. This conclusion is not only reason for corrosion but also for the formation of blisters. Generally speaking, blistering may be due to causes of a different nature, as has been shown by several investigators.

Nicholson and Jenkins[6] have given a survey of the different mechanisms of blistering such as expansion of the paint film, osmosis or electro-endosmosis. The possibilities for our case are restricted in so far that generally we have as a medium pure water only, while in the electrolysis case 0.1% NaOH solution is in contact with an epoxy-urea resin coating which has not changed in the least within the duration of the experiments. Therefore extra osmosis through saponification products as indicated by Gay[7] is out of the way. There will always be a tendency, however, for blister formation by *osmosis* because some soluble matter never can be excluded completely from the paint as well as from the substrate. Expansion of the swollen film as a cause for active water attraction seems a possibility when very flat blisters are observed, but generally the sphere segment shape of the blisters suggests a positive inner pressure.

Electro-endosmosis no doubt plays an important part in our experiments too, especially where blistering is concerned. After Gay and Mayne[8] as well as Wirth and Machu[9] the water in a paint coating on a metal tends to flow towards the cathodic spots on the metal surface, because the film usually has a negative charge, and the water therefore a positive one. Fig. 32 shows a *model*.[9] (In fact the signs of + and − refer to the potential of the liquid. The potential in the metal everywhere is almost the same).

Suppose with the help of this model we try to get a picture of the reactions of the *coated* steel in pure water, comprising the mechanism of water transport through the film, the assembling of water under the film (blistering), and the corrosion of the metal.

Let us take the corrosion phenomena first. Even when in contact with a salt solution no corrosion occurs under the intact paint film. The explanation after Mayne is, that anions are necessary for corrosion and for these ions the negatively charged film is a barrier.

In our pure water case the OH^--ions cannot enter the capillaries of the film (Fig. 32). Reaction (2) is prevented. Some H^+-ions are present in the capillaries of the film which acts as a weak acid, the wall of the capillary being one huge fixed anion. More H^+-ions reaching the surface means less OH^--ions because the concentration product is constant viz. 10^{-14}. This is another reason why (2) is stopped. Reactions (6) and (8) will proceed at the boundary metal—paintfilm because some oxygen will be molecularly dissolved in the water with which the film is swollen and because of its non-polarity will enter the capillaries. Thus we see why under the paint film anodic reactions are hampered and cathodic reactions are favored.

What happens to the coated metal just adjacent to an uncoated part? Under the coating, the metal is cathodic. Few H^+ ions are present in the capillaries from the ionization of the weak acid paint vehicle. Much water therefore is drawn to the metal with a certain amount of H^+-ions and the cathodic reactions (6) (8) (9) take place. The water gives rise to an extra blistering, especially in the vicinity of the uncoated corroding parts because the circular current, connected with the coupled anodic and cathodic processes tends to take the shortest way. The length of the way is important because although the resistance of the metal is to be neglected, the conductivity of the pure water is comparatively low.

Let us return to the scheme, drawn up in the beginning of this installment. We may conclude that the suppression of

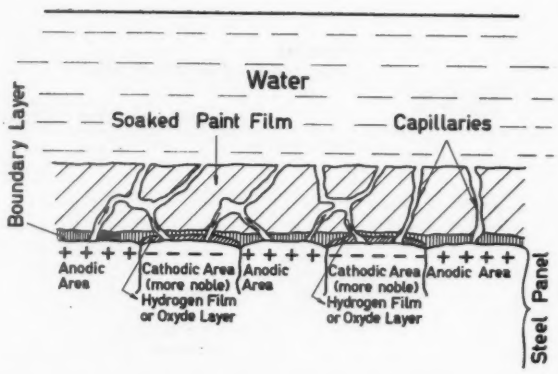

Figure 32. Schematic drawing of the conditions in the boundry layer and in the paint film.

blisters is due to the anodic nature of the Dia side of the corroding bare spots of the painted panel. Along these anodic spots will stretch cathodic zones and thus the special preference for blisters to develop here is explained, even with complete absence of general blistering. Along the corroding bare spots the metal under the paint film will be cathodic too which explains the formation of blisters along the corroding bare spots, bare panel edges included.

Besides there are some *complications*. In our investigation, we see a "*rhythmic*" kind of blistering. This phenomenon is not an isolated one. Along the corroded spots we often see blisterless zones.

The atomic hydrogen will exert here the same action as it does across the metal. Sometimes, we see blisters immediately along the corroding bare parts and after a blisterless zone, blistering at a certain distance (a few mm) starts again. The blisters along the bare spots are glutted with water which when being drawn to the metal surface carries some cations, in our pure water environment H^+-ions, partly at least, from which the water derives its charge. These H^+-ions are reduced at the cathodic spot which then, after a certain time becomes anodic, so that the blister grows no more and may shrink away even. (This may happen too at the Dia side of the bare spots in the beginning where sometimes a "reverse" Dia Phenomenon is seen.) The reason is that the hydrogen thus formed creates a blisterless area and if the said blisters were situated along a straight bare spot, the blisterless area will be rectangular. Beyond this area however, new cathodic blisters are formed under which in its turn the substrate becomes anodic again.

There are two complications in this special case: primarily when the liquid is 0.1% NaOH, thus diminishing the boundary potential, but bearing reducible cations as well, and secondarily the E.M.F. applied, (cathodic), acting on the contrary as a promotor of water migration. However, this does not prevent the water from not being drawn to where the blisterless areas apparently are formed, perhaps because under the film on the metal surface the influence of the local electrical fields is much stronger than that of the external field, keeping in mind the water resistance of the epoxy-urea resin film. Thus the altering of corroded and non-corroded areas is explained.

Another complication is the difference in speed to which the varied processes are subdued.

When a partly painted panel is immersed into the water the corrosion starts at once, and within an hour or sooner the atomic hydrogen has reached the back of the panel.

However, the penetration of water through the film in a quantity, sufficient to form noticeable blisters may take a time varying from days to weeks depending upon the film involved.

The differential aeration mechanism can start only when oxygen is transported which is dependent on the presence of water. Thus it can be understood that there may be a certain

(*Turn to page 97*)

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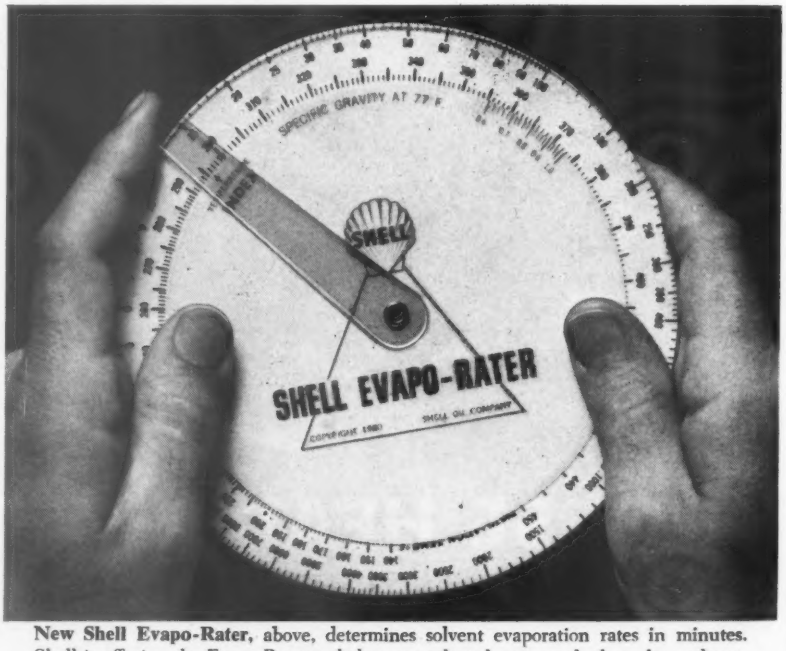

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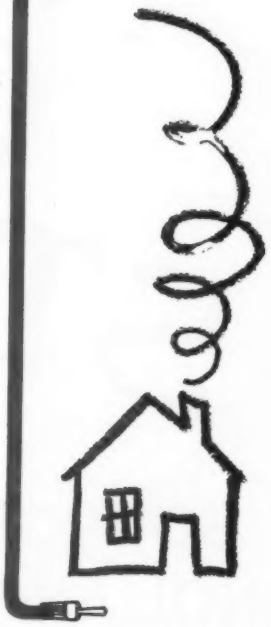

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*Specific MVT—Grams of water vapor passing through 100 square inches of film, 0.004 inches thick, per 24 hours. These data were obtained following the procedures of ASTM E-96-53T—Procedure E.

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A Staff Report

ALKYD RESINS -- RECENT TRENDS

Part VII
Alkyd Combinations

OF the many good properties of alkyd resins, one of the most important is the ability which alkyd resins demonstrate to combine with a vast number of other materials. These combinations may result simply because of physical compatibility or they may actually be the end product of chemical combination. Regardless of the mechanism, the utility and the scope of alkyd resin technology is vastly extended because of this characteristic. Whenever a new film-forming material or a potential film former is synthesized in the laboratory, the chemist thinks immediately of checking its compatibility with alkyd resins. To combinations of this sort alkyd resins may contribute flexibility, adhesion, good weathering, and gloss—properties normally associated with oil containing materials. From the products with which the alkyds combine, on the other hand, the composition frequently gains in hardness, resiliency, corrosion resistance, tensile strength, high temperature properties, solvent resistance, acid and alkali resistance, and fast dry. For example, the proper combination of alkyd resins with melamine resins produces compositions with excellent light colors.

In the portion of this article which follows there will be reviewed briefly some of the many alkyd combinations which are in use and which have been proposed.

In a paper, Lanson [*Paint and Varnish Production*, March, 1959] has listed some of the polymers and reactive functional materials which may serve to modify alkyd resins. The list is an impressive one and includes:

nitrocellulose
urea-formaldehyde resins
melamine-formaldehyde resins
phenolic resins
chlorinated rubber
synthetic latices
vinyl resins
chlorinated paraffin
epoxy resins
polyisocyanates
silicones
reactive monomers such as styrene
cellulose acetobutyrate
phenolic varnishes
polyamide resins
natural resins
monobasic aromatic acids

Modifiers such as the monobasic aromatic acids and the polyamide resins have already been discussed under alkyd resin ingredients. The other materials in this list as well as some not listed by Lanson will be discussed briefly below.

Natural Resins

Prior to the advent of alkyds, natural resins such as rosin and copals were widely used in the production of varnishes. It was only natural that paint chemists should attempt to incorporate them into alkyd resins. This has been done successfully and a variety of alkyd resins have been available for many years which are modified with natural resins.

Also useful in alkyd resin technology are the so-called ester gums which are glycerol or pentaerythritol esters of rosin acids. These may be used as such or they may be modified further with maleic anhydride or phenolic resins. Also, the rosin esters may be modified by hydrogenation, dimerization, or disproportionation. All of these treatments improve the stability of the rosin. Treatment with maleic anhydride improves the hardness of rosin esters. Actually, the ester itself may be treated with maleic anhydride or the rosin may be maleinized prior to esterification. Cyclopentadiene adducts of rosin also are valuable in the preparation of hard resinous substances for combination with alkyds. The cyclopentadiene adducts may be copolymerized with styrene to vary properties even further.

The use of hard resins such as rosin derivatives, as well as of oleoresinous compositions in combination with alkyd resins has been discussed in a publication

by the Cleveland Paint and Varnish Production Club [Official Digest, *295*, 545 1949)].

These resins which are hard, brittle materials confer to the alkyd films, rapid dry and hardness. Also, since many of these resins are available in very pale colors and with very high gloss, they contribute these properties also. Because the modifiers are non-polymeric in character, solutions of alkyds prepared with them have low viscosities and solvent release is normally good. Accordingly, such combinations are used as coatings for wood where the films must be sanded during finishing. Combinations of natural resins with short oil alkyds are useful as primers and as enamels for electrical equipment, food containers, metal furniture, toys, and hardware. If medium oil alkyds are used in combination with natural resins, coatings result with high gloss which are useful for machinery, gasoline pumps, trucks, implements, and water-resistant architectural finishes. Wrinkle finishes may be produced from such combinations which are competitive with tung oil based wrinkle finishes. One of the important features of the natural resins is, of course, their low cost.

This technology is now well entrenched and it is not likely that many new advances can be expected.

Phenolic Resins

Like the natural resins, phenolic resins were well entrenched in the protective coatings industry when the growth of alkyd resin technology started. It was discovered very early that phenolic modified alkyds had many advantages. For example, they dry very rapidly in air and through-dry is excellent. The phenolic resin confers to the alkyd a high degree of resistance to moisture and solvents like gasoline. Weathering is also improved. Numerous formulations are possible with alkyds and phenol-formaldehyde condensates because of the good compatibility the two materials exhibit. Thus, they may be combined over a wide range of proportions in order to achieve properties desired for a specific application. Normally, phenolic modified alkyds demonstrate the good adhesion, gloss, and brushing properties of the alkyds while at the same time showing the solvent resistance, rapid dry, and good water resistance of the phenolics. Products of this type are used as brushing enamels, as metal primers, and for repair of damaged coatings.

Of interest for combination with alkyd resins is a phenolic intermediate known as "Methylon resin". One grade of this material is recommended for use with medium to short oil alkyds to obtain combinations with excellent chemical and solvent resistance for use as drum and can linings and primers where special resistance properties are required.

When phenolic resins are used in combination with alkyds, the most common ratio is five to 30 per cent of phenolic and the remainder alkyd resin. Among the important applications for such mixtures are air drying and baking enamels and undercoats for enamels or lacquers.

Again, as with the natural resins, this technology is well entrenched and it is not likely that a great deal of new technology will result in the years to come.

Lacquers

The modification of lacquers based on nitrocellulose and other raw materials with alkyds is also well-established technology. One of the important functions of an alkyd resin in combination with nitrocellulose is to aid in increasing the solids content of the composition. At the same time, it serves to increase adhesion and gloss and contribute to the durability of nitrocellulose lacquers.

Both the oxidizing and non-oxidizing types of alkyd resins may be used with lacquers. The non-oxidizing variety, however,—i.e., those based on saturated acids, are used more widely simply because "lifting" occurs when lacquers containing oxidizing types of alkyds are recoated. However, this latter type of alkyd does find application where only one coat of lacquer is to be applied.

A typical nitrocellulose based furniture finish would comprise one hundred parts of nitrocellulose, 25 parts of a hard resin such as an ester gum or maleic modified ester gum, 125 parts of a non-oxidizing alkyd, fifteen parts of chemical plasticizers such as dibutyl phthalate, and fifteen parts of blown castor oil. The ratio of these reagents may be varied depending on final properties desired, but it can be seen that the alkyd resin is an important constituent.

Typical of nitrocellulose-alkyd combinations is the clear lacquer described by Federal Specification TT-L-57 which is entitled "Lacquer, Rubbing Clear (for wood furniture)". Formulations which meet this specification may be made with phthalic anhydride coconut alkyds or phthalic anhydride castor oil alkyds. One recommended formulation uses a pure non-drying castor oil modified alkyd containing 35.5 per cent phthalic anhydride and 48.3 per cent of oil. A recommended formulation includes 17.95 parts of this alkyd with 6.66 parts of RS ½ second nitrocellulose (70 per cent in butyl alcohol) and an equal amount of RS ¼ second nitrocellulose (70 per cent in isopropanol). The alkyd solution used is a 65 per cent solution in xylene. In addition to the xylene, toluene, methyl isobutyl ketone, butyl acetate, amyl acetate, ethyl alcohol, and butyl alcohol are included in the formulation. In this particular recipe the ratio of nitrocellulose to alkyd is 1.0 to 1.25.

This same type of alkyd may be used with nitrocellulose and tricresyl phosphate, together with the appropriate pigments, in the formulation of a lusterless, hot spray lacquer which is described in Federal Specification MIL-L-11195.

Of particular importance is the fact that alkyds confer to lacquers excellent outdoor durability. This, of course, is the prime reason for their use in automobile finishes. Normally, the limiting factor in the amount of alkyd resin that may be used with lacquers is the hardness required, since the introduction of the alkyd detracts from the hardness of the nitrocellulose.

Thus, a typical automotive lacquer might contain 100 parts of nitrocellulose, 75 to 150 parts of non-oxidizing alkyd, 25 to 30 parts of plasticizer such as dibutyl phthalate, and zero to 15 parts of blown castor oil. Such compositions might also be modified by the addition of melamine-formaldehyde resins to improve hardness and other film properties.

In general then, nitrocellulose-alkyd combinations contain from 30 to 70 per cent of alkyd as compared to 70 to 30 per cent of nitrocellulose, depending on properties desired. One of the outstanding characteristics of the nitrocellulose lacquer-alkyd combinations is their fast drying time. Another is their decorative properties.

In addition to cellulose nitrate, there are other cellulose derivatives which give lacquer-like coatings. These include cellulose acetate, cellulose acetate propionate, and cellulose acetate butyrate. The last of these is by far the most accepted in the coatings industry. In general, they have better light and heat resistance than cellulose nitrate, but lower solubility and compatibility with other film formers.

An extensive discussion of the use of alkyd resins with cellulose ester lacquers may be found in an article by Gelienkirchen [*Deut. Farben—Z.*, *7*, 339, 383 (1953)].

Ethyl cellulose is an ether which has lacquer-like properties and is distinguished by good heat stability which makes it useful in hot melt coatings. Benzyl cellulose is a related ether which has very good water resistance but provides rather soft films.

Combinations of ethyl cellulose and alkyd resins have been described by Burrell and Clark [U. S. Patent 2,593,976, April 22, (1952)]. The particular type of alkyd resin which is said to be useful in this patent is made by condensing dicyclopentadiene with maleic anhydride in the presence of an oil such as soybean oil. After condensation is complete, a polyhydric alcohol such as glycerol is added to obtain an alkyd resin which is compatible with ethyl cellulose. A typical lacquer formulation which this patent recommends comprises fifteen parts of ethyl cellulose and an equal quantity of the resin combined with the appropriate solvents.

The actual chemical combination of oils with cellulose derivatives is described by Scholz and Taylor [U. S. Patent 2,553,682, May 22 (1951)] who proposed the interaction of a fatty oil with a cellulose ether or ester containing free hydroxyl groups. The product is then reacted further with a dibasic acid.

There is little question but that lacquers based on nitrocellulose as well as on other cellulose derivatives and related materials will continue to provide an important outlet for alkyd resins for many years to come. To be sure, there are clouds on the horizon, particularly as exemplified by newer finishes for automobiles based on acrylics. Continued research and advancing technology are the only sure answers to the threats provided by new raw materials and new formulations.

Urea and Melamine Resins

Alkyd resins are widely used in combination with urea and melamine resins particularly where excellent whites are desired such as for home appliances. The combinations are high bake finishes and may include five to 50 per cent of the urea or the melamine resin, the remainder being alkyd resin.

For high bake whites for appliances, normally 25 to 50 per cent of the urea or melamine resin may be used. In automobile undercoats as well as undercoats for appliances and tile board, the resin content may vary from five to thirty per cent. In automotive and machinery enamels, the resin content may vary from ten to thirty per cent.

The resins which result when urea or melamine are condensed with formaldehyde are hard and brittle with excellent chemical resistance. Because of their brittleness, they require plasticization before their use is practical. Over many years, short and medium oil length alkyds have been found to be ideal plasticizers. Among the outstanding characteristics of such combinations are their excellent color and color retention, their rapid curing properties and high temperature resistance, excellent hardness, reasonably good flexibility, excellent resistance to oil and reasonably good resistance to water and to weathering.

The actual properties of the final composition depend on the ratio of the two materials. At the high level of 35 per cent melamine, one obtains high viscosity solutions with limited solvent compatibility but very fast cure and very excellent color retention. With the lower quantities of ten to fifteen per cent of melamine or urea resin, one obtains slow cure, good solvent compatibility, good compatibility with other film formers or modifiers, and good gloss.

Urea resins tend to give less flexible combinations than do the melamine resins. Urea resins are frequently used for their lower cost. Also, they provide better adhesion and higher viscosity than do the melamines at equal solids. Repair of defects is easier because films are generally softer. They respond to acid catalysts which speed cure at lower temperatures. The melamine resins, on the other hand, provide very much faster cure, much better alkali resistance, much better color and gloss retention, particularly on over baking, less film shrinkage on curing, better initial gloss and flow, much wider baking range, and better exterior durability. Of particular importance when one uses melamine resins is the ability to obtain rapid curing at lower temperatures, thus making possible infrared baking schedules.

One of the very important advances in the area of melamine-alkyd combinations is in the field of automotive coatings. Late in 1958 an announcement was made by Chrysler that their 1959 cars would be painted with a high quality enamel based on a combination of melamine and alkyd resins in which the melamine content was twenty to thirty per cent. This compares with approximately ten per cent of melamine in previous finishes. Although such finishes are more costly, they make possible the production of light colored paints which are so important for modern automobiles.

Before making the decision to use these in all 1959 cars, the Chrysler Corporation used these finishes on 60 per cent of their models in 1958. The Ford Motor Company also makes use of the higher melamine finishes and is reported to have used them on 65 per cent of the Ford cars in 1958, having started to experiment with these types of finishes as early as 1954. Studebaker and American Motors also have been reported as switching to the high melamine content paints. Thus, of the major automobile manufacturers only General Motors does not use this type of finish, and they have pioneered the acrylic type paints which

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have advantages of a high degree of color fastness and excellent weathering properties together with retention of initial gloss and ease of formulation with metallic pigments. On the other hand, the acrylic finishes are thermoplastic whereas the melamine-alkyd combinations are thermosetting and thus offer high stain and solvent resistance. Also, they are hard and tough as soon as the baking operation is finished. The thermoplastic resins, on the other hand, require as much as six months to achieve maximum toughness. The melamine-alkyd combinations are said to cost approximately one dollar less per car than the acrylic finishes.

Another advantage of the melamine-alkyd combinations is that they may be used at high solids content for which reason a two-mil film may be achieved with only two coats whereas the acrylic lacquer requires four coats.

Research continues on melamine resins to be used in combination with alkyds and one such material announced recently is believed to be a precombination of melamine and alkyd resin. It is recommended for use with standard alkyds at a level of about fifteen per cent. Among the advantages claimed for this new melamine resin is that formulations based on it provide good finishes, excellent hardness, and high impact resistance.

Generally, urea or melamine-alkyd finishes are used on metal. They may also, however, be used on wood but normally a catalyst is required so that the finish may be force dried at relatively low temperatures. Certain textile and paper coatings, properly catalyzed, are also based on such combinations.

It is interesting to trace the growth of the melamine and urea resins for protective coatings. In 1949 approximately eighteen million pounds of the urea and melamine resins were produced for protective coatings uses. By 1957 this volume had more than doubled to 37 million pounds. J. M. Butler in a paper [*Paint and Varnish Production*, March (1959)] points out that on the assumption that these resins were combined with alkyds at the ratio of 20 pounds of rosin to 80 pounds of alkyd, it follows that 34 per cent of the 456 million pounds of alkyds produced in 1957 were used in combination with urea and melamine resins. In 1949 the figure was 27 per cent, on the same basis. It may be seen then that such combinations are a very important factor in alkyd volume. Butler also points out that one of the important ways to increase this volume is to develop technology which will make possible water based urea or melamine-alkyd resin combinations.

The chemistry of the urea and melamine resins as well as the chemistry involved in the formation of a thermoset combination by combining them with alkyds is quite complex. Normally, the urea and melamine-formaldehyde resins used in coatings are modified either with butyl alcohol or with capryl alcohol. Without such modifications, compatibility with alkyds and solubility in hydrocarbon solvents cannot be achieved. The capryl alcohol-modified resins demonstrate greater compatibility with other resins than do the butyl alcohol modified materials and

(*Turn to page 97*)

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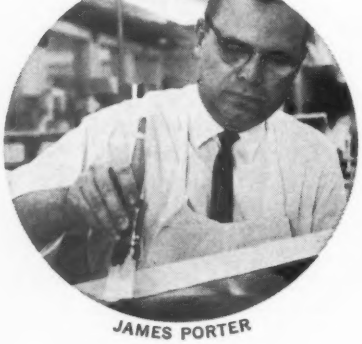

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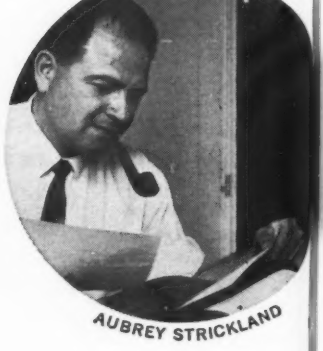

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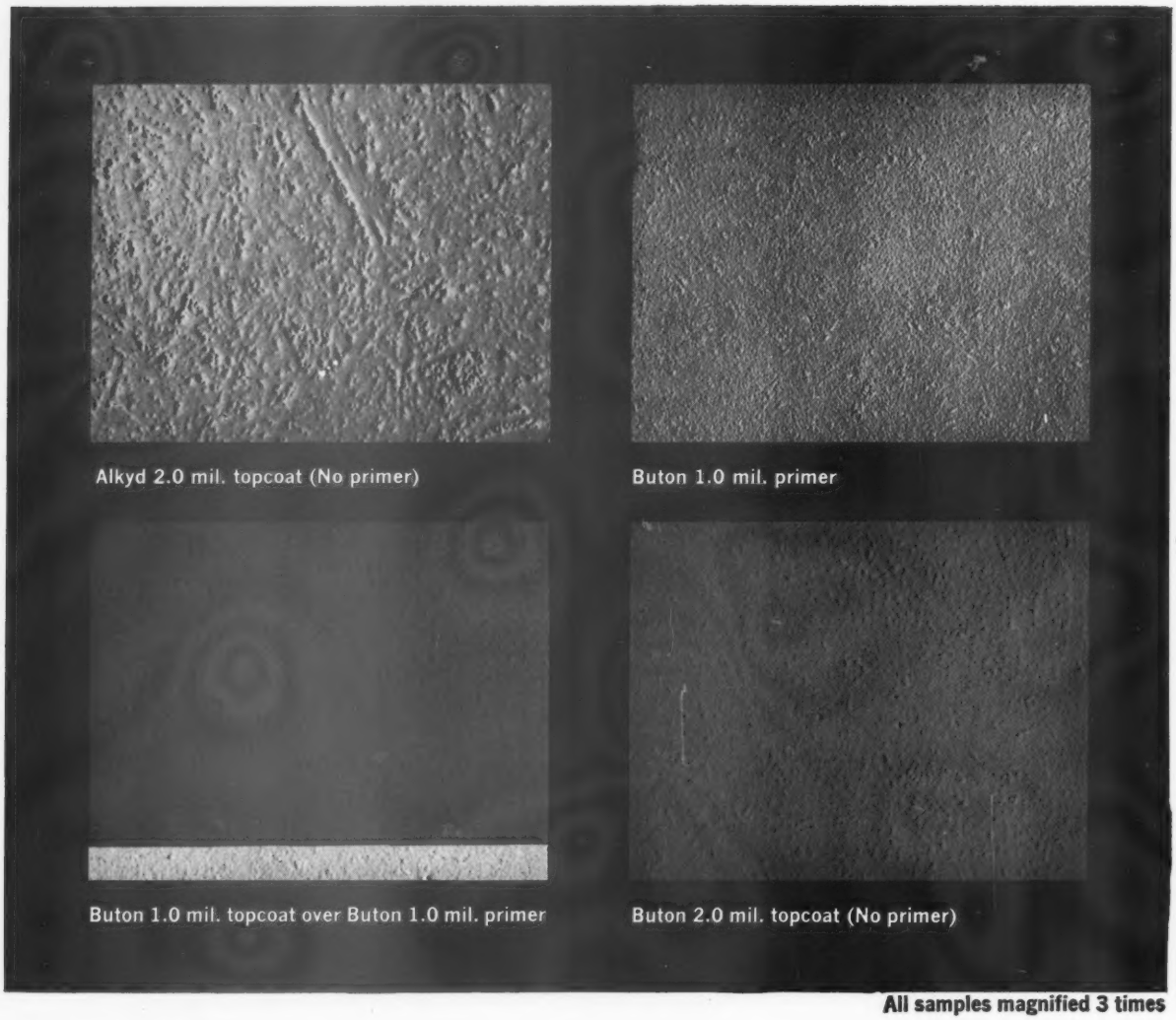
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The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Modern Words

OUR family dictionary is almost a quarter century old. Check your own; I imagine you will be as (rudely) shocked as I was at the rapid passage of the years. Also, one just doesn't go out and purchase a dictionary very often. It is a move preceded by much thought—mature contemplation, if you will—after all, the language we use doesn't change much. Or does it?

Consider the word *flat* a moment. As a noun our dictionary has eleven definitions as varied as a description of terrain, or a musical note, or even a type of residence. But the definition used by intimates of the stage, screen and television (another new-comer!) is nowhere to be found.

This is by way of introducing a visitor from Hollywood we had recently. He is employed in the making of movie and TV sets. Not unnaturally our talk turned to set decoration—and *flats*. Made up of 4′ x 8′ plywood sheets attached to a supporting scaffold, when appropriately decorated these appear to the unsuspecting public at the other end of a projector as the monumental buildings of New York, the shanties of Cannery Row, a lush Monte Carlo establishment—almost every conceivable interior and exterior part of the world can be realistically duplicated.

One step in the preparation of a flat was of more than passing interest: the bare plywood is first covered with blank white wall paper before being finished. This serves a two-fold purpose. It is a "base" for subsequent papering or painting, providing a smooth, even ground to work on. Second, it allows the finishing and decorative coats to be readily steam-stripped along with the base and so leave the board clean for yet another set.

Though wallpaper is often used, and plaster for three-dimensional effects, paint is the most widely utilized finishing medium. Realistic, picture-like reproduction is important but so are the tricks of the trade developed over many years, which give just the right touch of authenticity to the set.

Now it is true that this visitor *may* have started something going that could eventually result in a new dictionary gracing our bookshelves—but don't think that it will happen tomorrow, or even next month. I consider myself a progressive fellow in most respects, but when it comes to my "Webster" I'm much less mobile. Nevertheless, I couldn't find *thermoplastic* and *thermosetting* either. I may move faster than I thought!

Thinking and Dreaming

EVER hear the old saw to the effect that when you dream of someone that person is thinking of you? I've tested this and can find no validity in the proposition. But I do see on many varied and far-flung fronts much interest in our industry and what it can contribute. Other people *are* thinking about us—and do we realize it?

Why, you can go back to Shakespeare. For example, consider the philosophy in Sonnet CXLVI: "Painting thy outward walls so costly gay? Why so large cost, having so short a least, dost thou upon they fading mansion spend?" It is obvious that if people *today* believed in *that* sort of approach to the care of their habitation, we'd be out a goodly chunck of business. After all, a main part of *re*-decorating is a new, sparkling, paint job—and it is probably the least expensive, but most satisfying, method of doing over a home.

While Mr. S. may not appreciate the potentialities of our industry, others do—and they are living today! *Chemical and Engineering*

News reports (Feb. 13, 1961) that "... a Federal Housing Administration field directive will kick off the first cooperative industry-FHA training program in paints for FHA inspectors. Initiated by the National Paint, Varnish and Lacquer Association, the program is an accelerated course in paint properties and formulations, surface preparation, and application techniques. Its aim is better inspection methods to assure that contractors conform to FHA's minimum property standards." This is certainly something in which the "paint industry and prospective home owners alike have a stake."

During June, the Forest Products Research Society held its fifteenth annual meeting in Louisville, Ky. As reported in *Wood and Wood Products* (August, 1961), "One of the far-reaching papers, interesting to practical and theoretical researchers alike, was presented by H. L. Mitchell and M. Y. Pillow of the U. S. Forest Products Laboratory. It set forth a new concept of wood quality for the guidance of technologists. Under the concept, quality is viewed as the result of physical and chemical characteristics of the tree, and resultant lumber evaluated solely in terms of its suitability for various end products or uses. Among wood quality indicators evaluated are: density, ratio of summer to spring wood, *paintability*, glueability, growth rate, figuration, compression and tension wood, and failures." While the italics are mine, there is no minimizing the importance of out industry's potential contribution. There may be other methods of finishing wood but none are nearly as universally used as organic coatings.

Earlier this year than the meeting of the F.P.R.S. two other conferences were held, designed not only to bring the lumber and coatings industries into a more intimate and cooperative relationship, but also to enhance their relative positions in the highly competitive marketplace. As reported a meeting was held in San Francisco sponsored by the California Redwood Association. The representatives of twenty coatings manufacturers and research and sales promotion men of the redwood industry discussed "ways of making life easier for the home builder and the home owner." Specifically they explored "possible ways the redwood lumber and paint manufacturing industries could work together in developing and testing exterior redwood finishes that would provide a longer service before refinishing became necessary and also would make refinishing easier. Also discussed was the development of interior natural finishes more resistant to both marring and fading." These laudable goals will be implemented through a second meeting later this year.

Another Meeting

On april 27-28, a special meeting of the National Lumber Manufacturers Association Committee on Paint and Finishes was convened in New Orleans. Over one hundred representatives of the paint, lumber and home building industries heard Mr. W. G. Van Beckum, vice president for research and development, Pacific Lumber Co., keynote the meeting: "Wood's exterior use is being threatened by various competitive materials... Immediate joint efforts are required to increase finish life and eliminate premature failures... a ten-year refinishing cycle is the minimum

performance requirement needed to maintain wood siding in a competitive position."

Tying the sentiment of these meetings together is simple enough and points the way for the next step necessary to hold the huge market represented by exterior siding. Our stake in pre-finished wood—and hardboard and metal!—represents much business. The trade sales portion of our industry is on the verge of having the industrial group absorb a goodly share of their business; but this is another story, the import of the present problem is centered upon keeping our business in this vital and dyanamic sector of the economy. Initiation of research and development programs aimed toward rapid achievement of the goals stated above are required *now*. If we don't do so the solution will come from some other quarter.

Other industries *are* thinking about us; dreaming can *not* be our answer.

Space Paint

THE multitude of exacting tasks demanded of organic coatings merely one/one-thousandth of an inch thick almost defies listing. The durability, resistance, adhesion and hardness qualities—to name but a few—built into the products of the chemical coatings industry, are high indeed. In fact the level of performance of a properly designed finish tailored for a specific job is almost beyond belief. And yet another triumph of technology can now be added to the roster of success stories. Paints that can actually control the temperature of satellites are being produced—and even better ones are on the way.

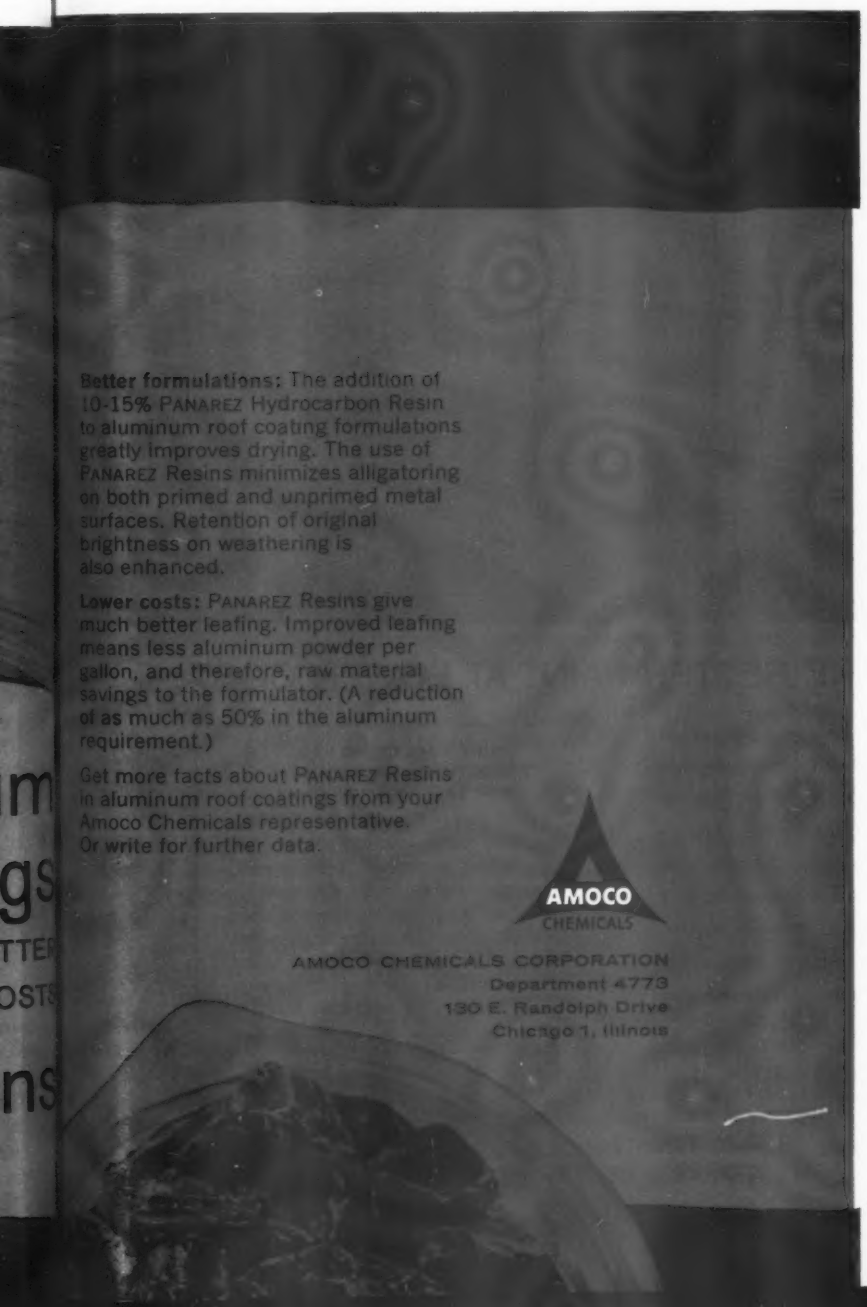
Chemical and Engineering News (Feb. 20, 1961) reports that the National Aeronautics and Space Administration has a project that is successfully coping with this vital problem. Under the leadership of G. A. Zerlaut, a group at the Huntsville, Ala., Space Flight Center is engaged in research that will have the practical end result of producing either a cold or a hot surface (or, temperatures in between) whatever the designers desire for their instruments or travelers.

The two most influential factors to contend with are solar absorptivity (the ratio of the amount of the sun's energy absorbed to the total amount of energy hitting the surface) and emissivity (the measure of the amount of energy emitted by a body). A low solar absorptivity, approaching zero, in a paint yields a cold surface; a high value, close to one, and a low emissivity, less than 0.5, produces a hot surface.

High ultraviolet radiation in a vacuum — a prevalent condition hundreds of miles in space — can undesirably increase the absorptivity of a paint, particularly white.

Specific finishes, both vehicle and pigment, are used on the inside surfaces of the satellite as well as on the outside. Interiors are running to air-dried silicone vehicles pigmented with anatase titanium dioxide; exteriors use the same type of resin but pigmented gray (rutile TiO_2 plus carbon black) or red (iron oxide, which has excellent resistance to ultraviolet degradation).

Though other methods of temperature control can be used, such as the type of metal surface, i.e., polished or sand blasted, paints offer greater latitude of application and specific tailoring.


Better formulations: The addition of 10-15% PANAREZ Hydrocarbon Resin to aluminum roof coating formulations greatly improves drying. The use of PANAREZ Resins minimizes alligatoring on both primed and unprimed metal surfaces. Retention of original brightness on weathering is also enhanced.
Lower costs: PANAREZ Resins give much better leafing. Improved leafing means less aluminum powder per gallon, and therefore, raw material savings to the formulator. (A reduction of as much as 50% in the aluminum requirement.)
Get more facts about PANAREZ Resins in aluminum roof coatings from your Amoco Chemicals representative. Or write for further data.
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Exterior paints formulated with Flexbond 800 vinyl copolymer emulsions have added consumer sales appeal. They are easy to apply, dry quickly, stay clean, are blister resistant and free from chalking. Colors stay bright years longer. Whites are non-yellowing, and most important . . . *manufacturing costs are lower than with other latex bases.*

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COVER STORY

RICHARD S. BENNETT:

"...A key weapon in the paint industry's arsenal is color."

RICHARD S. Bennett urges the paint industry to use more vigor in the competitive fight for the architectural surfaces market: "In today's inter-industry battle for the interior and exterior architectural surfaces market, a key weapon in the Paint Industry's arsenal is color."

Mr. Bennett laments the complacency that has allowed other industries to penetrate into the paint industry's basic market. How has this happened? "Through vigorous and imaginative color merchandising," contends Bennett, who has been President of Bennett's since 1950.

"Our other-industry competitors quite clearly have recognized the importance of color and have ably promoted it—even though the limited color selection they offer is in fact one of their greatest competitive weaknesses.

"The Paint Industry can far outdistance competing industries in the colors in which it can offer its architectural products."

What has the paint industry done about this situation? In answer, Mr. Bennett contrasts present merchandising and production trends with those of the last decade.

"A decade or two ago, there were a few paint manufacturers who greatly expanded the scope of their color offerings by the sound economic device of separately packaging paint colorants and base paints.

"Today there are very few manufacturers among us who do not base their paint-merchandising programs, in part at least, on white or neutral base paints into which colorants are introduced, either in pre-packaged quantities or by calibrated colorant dispensing devices of one kind or another. Many paint manufacturers offer accurately catalogued colors numbering in the thousands."

Mr. Bennett sees this movement as a sign that the industry is becoming aware of its competitive superiority in the field of color selection for architectural surfaces, and is doing something about it.

Bennett's, a pioneer in the field, started manufacturing and packaging fluid paint colorants in the early 1930's. Until 1956, Bennett's had produced upwards of 200-million colorant units packaged in one-shot "unitainer"-type metal tubes. Colorants are currently being packaged at Bennett's in polyester film packages, varying in capacity from one-fourth to four ounces.

WHERE is the advantage in multi-color paint products? In answer, Mr. Bennett cites a constant noted by Faber Birren (President of American Color Trends, Inc.) which can be relied upon in consumer color preference behavior: People rarely repeat the use of the same colors. Rather, they become progressively tired of their original color selections. Eventually, they reach the point where the need for color changes becomes a compelling one. Whether the surface is a so-called "never-needs-painting" one or not doesn't seem to matter. It gets coated with refreshing new paint colors.

Mr. Bennett, presently serving the National Paint, Varnish & Lacquer Association as Western Zone Regional Vice President, underlines the industry's progress in in the development of paint vehicles which promise extended durability and increased resistance to the common causes of premature paint film failure. He warns, however, that "as these new vehicles increase in variety and complexity, both the paint formulator and the colorant formulator may find their mutual objective of base paint and colorant miscibility more demanding and exacting." The extra effort in this direction is more than justified by the exciting potential of such cooperation between paint and colorant formulators.

Richard S. Bennett states this potential as a paint industry goal: "Exterior and interior architectural coatings with durability and maintenance characteristics equal to the best our other-industry competitors can offer—at paint's significantly lower applied costs—and in a range of colors competing industries cannot begin to match."

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BASIC KETTLE SYSTEMS

FOR VARIED PRODUCT MIXES

Shown is the highly versatile Patterson Dowtherm Kettle System at the Westinghouse Benolite plant. Included in this typical installation is a 1500 gallon reactor with fume stack, reflux and decanter system. Temperature is controlled automatically, regulating the flow of Dowtherm vapor to the 2-zone jacket. This unit indicates the capability of Patterson in engineering and building resin systems of all types and sizes. Patterson also builds electrically heated, direct fired, Aroclar, and hot oil or steam systems.

TURN THE PAGE

FOR MORE INFORMATION

Patterson Foundry & Machine Company

Gentlemen:

*Please arrange to contact us about a*_____

_____

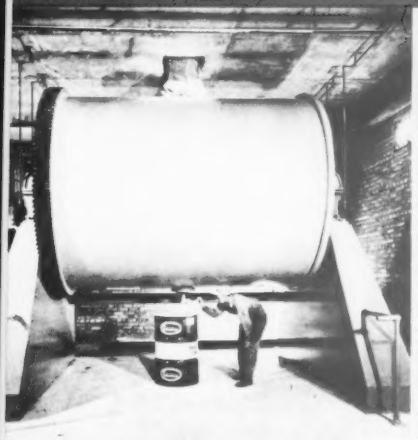
NAME_____

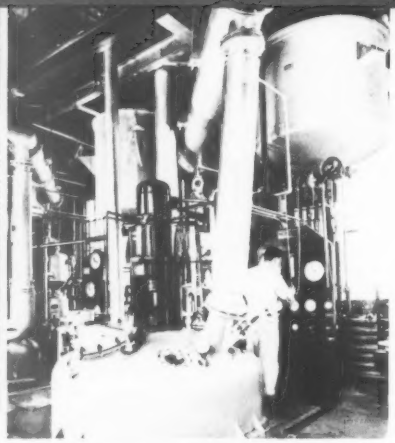
TITLE_____

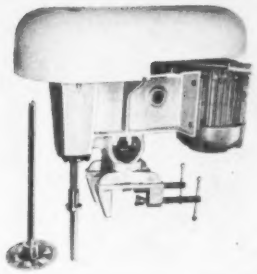
COMPANY_____

CITY_____ STATE_____

Current Production at Patterson FOUNDRY AND MACHINE COMPANY for the Paint & Varnish Industry





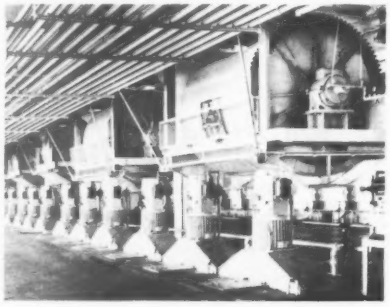


Patterson's Famous For Grinding Mills

Patterson is the only company in the world building a complete line of batch type and continuous feed ball, tube, and pebble mills of all types and sizes. Typical of those in operation are illustrated above, and are in the production lines at Glidden Paint Company at Cleveland. These mills are used to grind all types of paints, varnishes, enamels and paper coatings and other industrial products. Your choice of Patterson equipment insures you lasting quality, dependable year after year operation!

Ceramics for Grinding Media and Lining Blocks

Patterson offers immediate delivery on all types of mill linings and grinding media. A choice of "*Arlcite*" or "*Porox*" mill and tank linings and grinding media materials is a guarantee of quality and satisfaction.



Wizard Portable Variable Speed Agitator Power as you want it from a fix speed motor — AT THE TURN OF A HA DLE! This new mixer outdates any model n on the market. It's light! It's compact! Provid up to 50% more horsepower than any compe tive unit at this price! A new chuck system w a quick release allows for easy removal of shaft and impeller from the agitator unit use time after time without cleaning! Write complete brochure! Ready now for immedi shipment from stock. *Also the all new* 5 Wizard, priced far below others — nothing l it; an entirely new design!

Grinding Mills In addition to the usual l mills found on the production floor of Americ leading paint manufacturers, the Patterson na is to be found on thousands of installations wh grinding is a part of the production program typical installation is the one shown where plant has used these mills almost continuou since their installation more than 40 years Patterson is the word for grinding mills in Paint and Varnish field . . . none finer!

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Litho

PRODUCTION

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS

Raffi and Swanson, New England paint manufacturers, uses this visible record system to effectively speed the processing of customer orders. Formulation data and other pertinent information is housed in this one, unlimited-access bank of files. See page 73

Important news
for users of 2-gallon pails –

Milton introduces the TINSTEEL pail, a major breakthrough in pail production—one which cuts your handling costs, slashes dealer returns and helps boost your sales!

WHAT makes new, Milton 2-gallon TINSTEEL pails so special? Several important things:

1. Milton TINSTEEL pails are made of heavy gauge *tin-plate*. This eliminates the possibility of coating flaws inside or outside the pail. Spoilage is reduced.

Another factor in this regard is TINSTEEL pails' 12-lug covers. They fit each pail tightly. This, plus minimal "headspace," reduces the possibility of skinning.

2. Because they are made of tin-plate, Milton TINSTEEL pails can be lined with the same material that has proved so successful in gallon and quart cans used for emulsion paints.

3. Thanks to special machinery, new, TINSTEEL pails come in a range of sales-attracting colors! (Left uncoated, tin-plated TINSTEEL pails stay bright, fresh-looking, attractive.)

4. TINSTEEL pails come to you packed in the same type of kraft paper bags which have proved so practical over the years for packing smaller sized paint cans. Net result? Empty, TINSTEEL pails are handled and stacked as easily as smaller paint cans.

5. Another factor recommending Milton 2-gallon TINSTEEL pails is their unusual strength. The heavy gauge steel under their bright tin-plate makes them endurably rugged.

Also, Milton TINSTEEL pails have *straight* sides. This gives them *vertical* strength, makes them resistive to waste caused by damage in handling and stacking.

6. Because production varies seasonally, many successful firms prefer to hold materials stocks to a minimum, ordering additional items as needed.

You can follow this profitable practice secure in the knowledge that fully automatic equipment enables Milton to deliver all the 2-gallon TINSTEEL pails you're likely to need to keep production flowing smoothly. (Milton can now turn out enough TINSTEEL pails daily to meet the total requirements of *all* users!)

Of course, there are other advantages, too, in buying 2-gallon TINSTEEL pails—and smaller sized cans – from Milton. Consider these:

Milton service is quick. Often you receive delivery within 24 hours after you call.

Milton 2-gallon TINSTEEL pails are available for shipment with other can sizes in mixed carload and truckload lots or almost any fraction thereof.

Milton containers are moved from the carrier into your plant on dollies. This mobilizes receiving and speeds unloading time. The entire operation proceeds with minimum use of your manpower. Dollies are left in your plant until the next Milton delivery; this facilitates movement of cans from storage point to production line. Again, both time and labor are saved. (This service is available within trucking radius of New York City.)

For all these advantages, Milton TINSTEEL pails are competitively priced.

Whether you presently use 2-gallon pails, or may someday, find out more about the superior, new kind Milton makes. And for all types of cans—lined, unlined, plain, lithographed, standard and made-to-order, enjoy the time-saving, dollar-saving advantages of dealing with Milton. A trial order will convince you. Call today. EVergreen 3-1100.

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Our 34th Year

FOREMAN TRAINING AS A PROCESS

By
Lawrence Shatkin

ELLIS C. MAXCY stated, "It is generally conceded that persons in supervisory positions have a dual responsibility: first, for the processes, materials and equipment under their supervision; second, for the welfare of the people whom they supervise." The supervisor or foreman must be trained in order to meet these responsibilities.

We must be interested in the effectiveness and performance of our foremen because they are a part of the management team. In implementing any change, the foreman is in a pivotal position to enhance its success. It is necessary to communicate new policies and programs in order to minimize and overcome the tendency of resistance to change. It is necessary to give the foremen an opportunity to participate in any change in methods and give them a sense of "feeling" when making these changes. The ultimate acceptance by the employee is based on a respect between the managers and the managed. The resistance to change is primarily caused by the new "social" factors which enter into the job situation. A foreman training program should start by allowing the foreman to express and expound on the problems where such training might be helpful.

Designing the Program

It is essential to know the goals of the program and how this process will help improve one's performance. It is an opportunity to bring forth thought-provoking ideas by an analysis of experiences and an attempt to understand the role of supervision. Such a program should strive for a better understanding of the extent of the supervisor's activities, an appreciation of his contribution to company objectives, and the attainment of increased skills in the "art of supervision." Human and social factors must become impregnated with the technical skills required of the supervisor, and a new and enlarged perception of individual and group behavior must be grasped in order to reach organizational effectiveness.

Many disciplines enter this process which must be learned. We see and evaluate situations in line with our own experiences, biases, and assumptions. Many situations are nurtured by how a person views the circumstances in line with his own set of personal influences. This calls for a conscious deliberation of all human relation problems, an expression of viewpoints and experiences, and a flexible position in many matters. The effective foreman must learn this skill of perception which is part of all employee relations.

Areas of Supervisor's Job

What are the essential qualities of a good supervisor? Is it necessary that he be a good administrator? After all, the heart of administration is focused on planning, organizing, controlling and coordinating activities. How much time should a foreman spend on training an employee or orienting a new employee? How much technical knowledge should a supervisor possess, or are his conceptual skills more important? These and many other questions promote a critical analysis and appraisal of the qualities we are seeking in a supervisor or foreman.

This complex structure can be categorized into major areas wherein lies these numerous factors. First of all, a supervisor must possess certain personal characteristics. Secondly, leadership qualities are required in order to get things done through people. Thirdly, the supervisor must assume managerial functions and learn how to manage technical and social innovations. Encompassing all of the above features is the most important trait—integrity. This is inherent in the individual and without it the foreman, supervisor or manager is doomed to failure.

Training Needs—A Process

I like to think of any supervisory development program as a process because a program connotes the eventual completion of an act whereas, a process indicates a continuous or chain reaction which does not terminate, but may rather slow up, change pace or change direction. Many internal records should be examined to determine whether a training program is necessary. Cost records, accident frequency, grievances and low production are indicators that further training is imperative. An effec-

Opinions expressed in this feature are not necessarily those of any particular firm or organization.

tive foreman must integrate the activities of his unit with the overall company objectives. Any training must evolve from the work situation, and this must fit into the company's short and long-range goals. The philosophy of top management will determine where these efforts will be directed.

The inceptions of a training program can begin meeting with your foremen as a group and discussing their problems. The manager should develop further meetings and integrate these problems with the activities that need improvement. The fundamentals of human relations should be reviewed and studied. If necessary, case problems can be analyzed. The crux of these meetings will be the sharing of many experiences.

In order to build job satisfaction into these activities, managers should orient their thinking by always giving reasons for their actions.

Evaluating the Training Process

Certain standards should be established in order to determine whether the training program has contributed to the effectiveness of the organization. This is very difficult to quanlify because the casual relationships are not easily measurable and other contributing factors may have come into play. Nevertheless, the judgment of a manager should be adequate. He knows whether the organization is operating more smoothly, delivery schedules are being maintained, customer complaints are negligible and productivity is high. He observes how effective his foremen are in handling day-to-day problems, and can correlate this with production, attitude and work performance. The manager can perceive any changes in the relationship between the supervisor and his superior. Improvements in communication and coordination should take place. All of these results are based on the premise that the supervisor has translated what he has learned into his day-to-day behavior and top management views these results as estimates and not as a statistic.

The "Coaching" Process

Our efforts must always be directed to narrow the gap between the existing conditions and what we would like them to be. Coaching is the process of helping the foremen develop by learning to plan and organize projects with priorities, and target dates for their completion. The manager observes, reviews and helps to improve this performance. Throughout this process there must be a balance between the delegated authority and the ensuing responsibility. The authority and responsibility must accompany the function and lateral movement within the hierarchical structure must be encouraged.

The functions which supervisors and subordinates deem most important are at times diametrically opposed. It is therefore necessary to aim for a balance in these viewpoints so all efforts can be superimposed one upon the other rather than cancel each other. We must determine the critical factors in the foreman's job.

•

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Spraylat Corp., manufacturers of spray-on, strip-off coatings, is moving its manufacturing plant to larger quarters which will be located at 730 S. Columbus Ave., Mt. Vernon, N. Y. The new plant will include improved laboratory facilities for coatings research.

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Fig. 664 Ball Mill with combination grinding and discharge door, gear guard and special optional controls.

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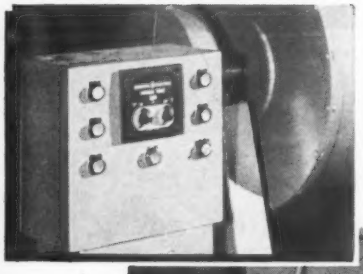
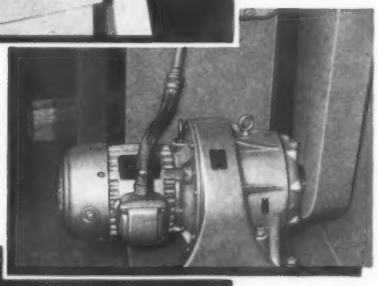


OPTIONAL CONTROLS



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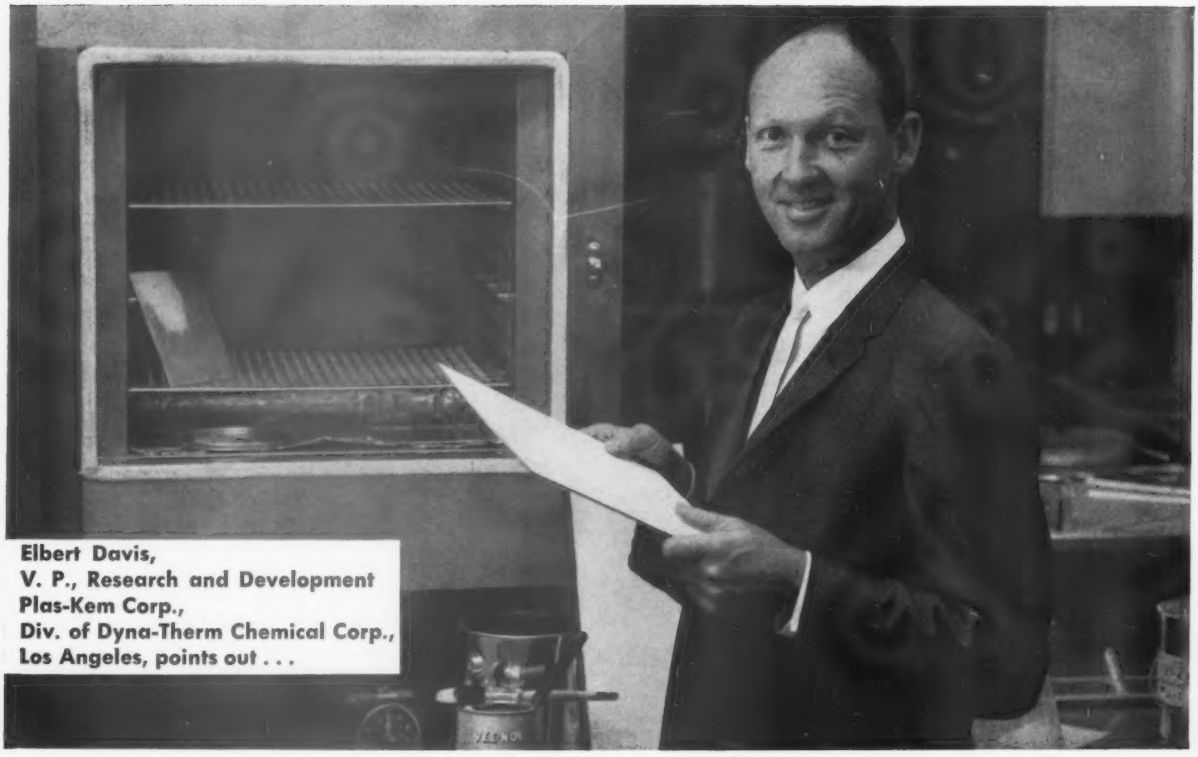

Elbert Davis,
V. P., Research and Development
Plas-Kem Corp.,
Div. of Dyna-Therm Chemical Corp.,
Los Angeles, points out . . .

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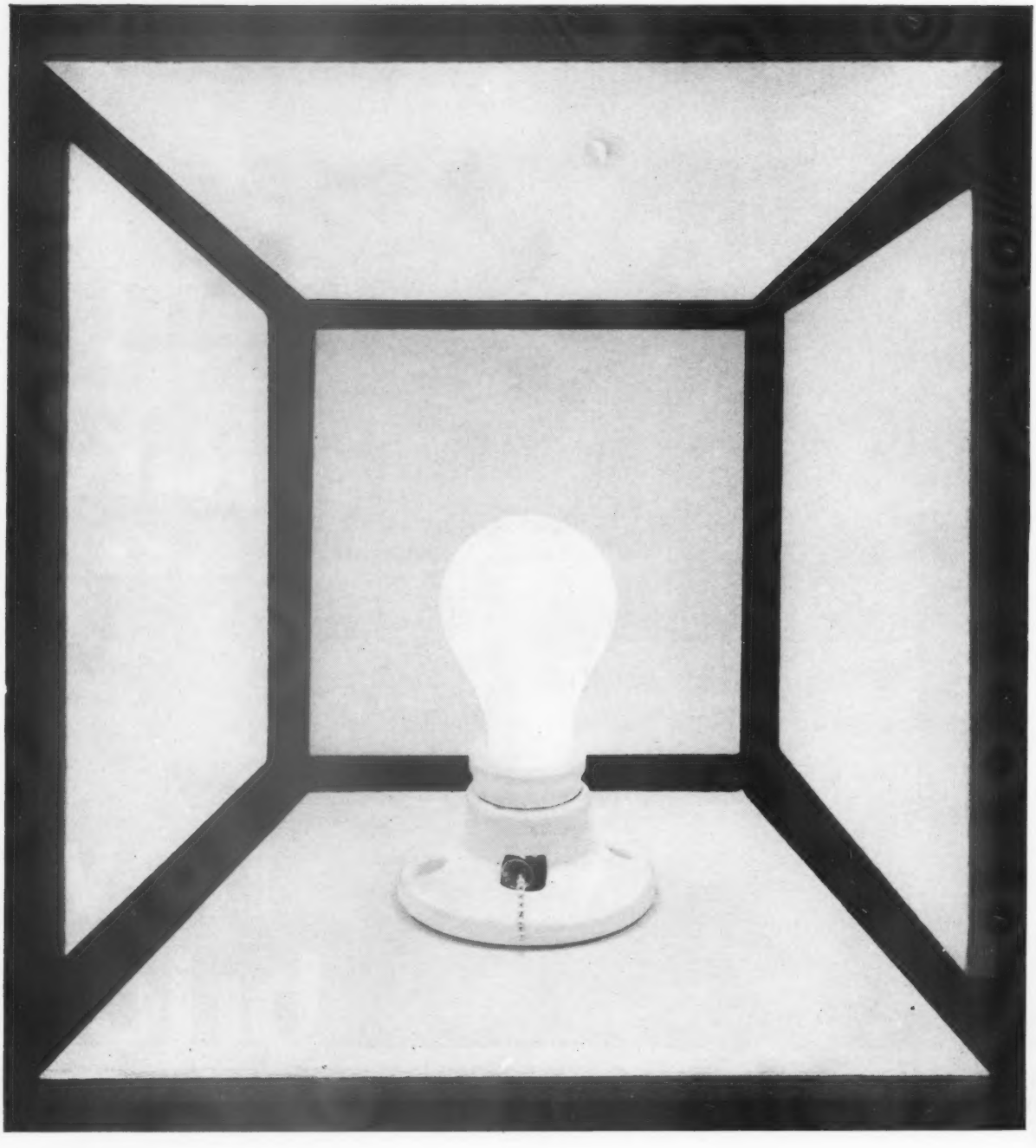

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JOHNS-MANVILLE JM

CENTRAL FILING *SPEEDS* CUSTOMER ORDERS

Before installing the visible filing cabinets, the formulas were housed in these unwieldy books. Only one clerk could refer to a book at one time, and at end of each day the books had to be locked in the safe for protection.

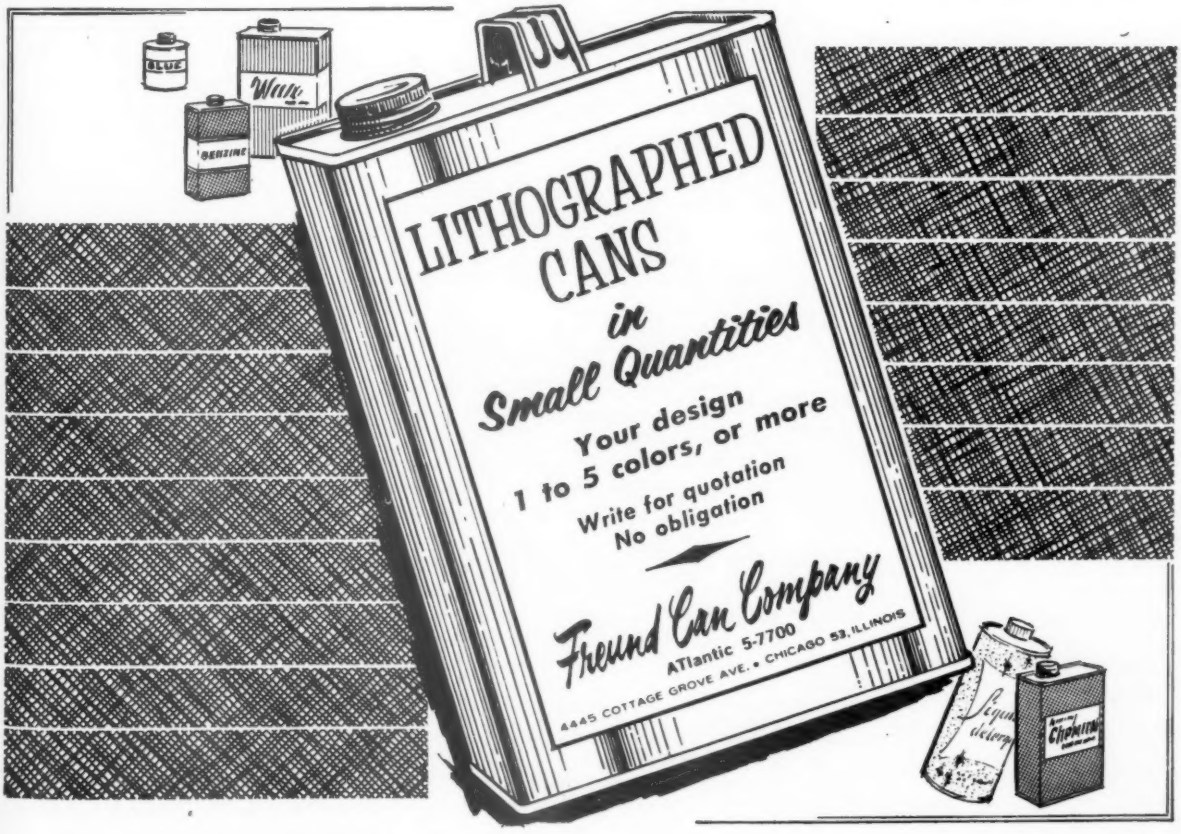
RAFFI and Swanson, Inc., Wilmington, Mass., manufacturer of protective and decorative coatings and inks, has devised a simple, effective system of implementing customer orders the minute they reach the plant. Basis of the new system is a bank of fast-access file cabinets created by Acme Visible Records, Inc., Crozet, Va., which enables one girl to translate a customer order into a manufacturing directive in seconds.

Self-Contained Card

The cabinets house all customer and manufacturer data in a centralized manner. Double reference by the clerk is eliminated, as she can now find all the required data in on self-contained envelope card.

When a customer now calls in for 10 gallons of XY, to take one example, the girl immediately refers to XY on one of the file trays, and pulls out the customer's original formula for XY.

The pink formula sheets for each customer using XY are enclosed in envelopes attached to hinges in the cabinets, along with the production sheets that will implement the



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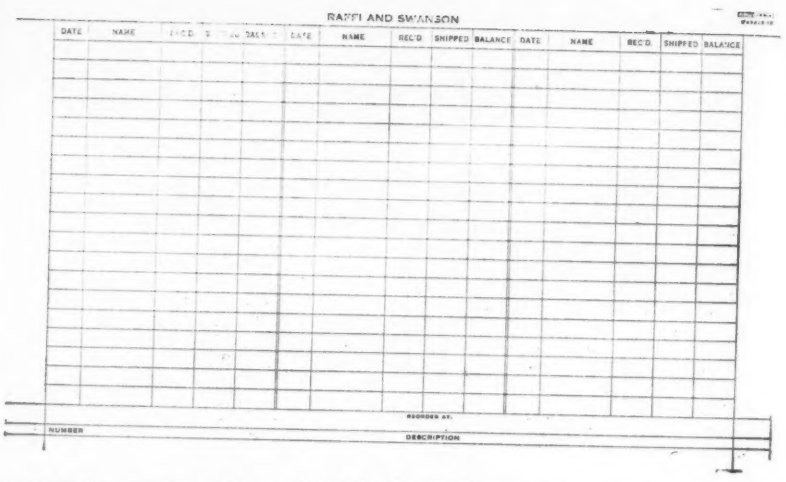
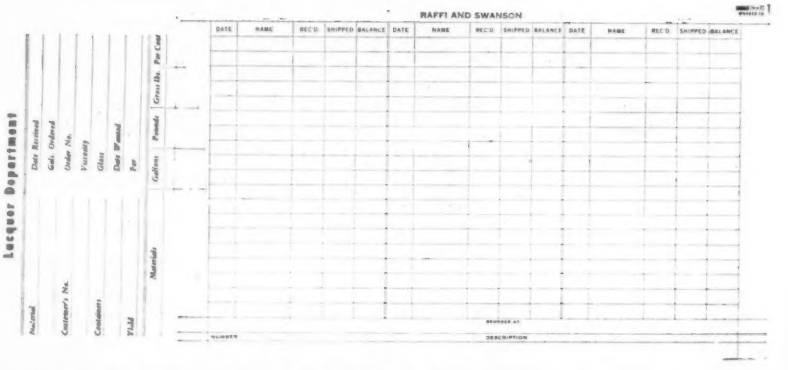
City.....

State.....



This is the envelope card on which is indicated the quantity of product manufactured, customer' name, date, shipping information, etc.



Enclosed in the envelope card are pink formula sheets for each customer. The left portion (Lacquer Department) is a facsimile of a formula sheet, shown extending out from the envelope.

order. The clerk pulls the production ticket from the folder with the formula sheet, checks the formula, retypes the formula sheet, and sends the detailed order to the plant.

On the envelope card, she indicates the quantity manufactured, the customer, date, and other data pertaining to this individual order. The pink formula sheet is retained in the folder as soon as it is returned from the plant. In this way, the company has in the file the latest manufacturing data on each formula as specified by the customer. Perforated holes in the envelope indicate at all times the absence or presence of each pink formula sheet.

Keeps Inventory Record

The card envelope, by showing the amount of each formula ordered by each customer, also serves as a stock finished product inventory, as well as formula housing and raw material inventory. Any checking about an order or formula can be accomplished by referring to the file.

Before installing the Acme Visible filing system, the formulas were housed in unwieldly books which were locked in the safe at the close of each working day. Only one clerk could refer to a formula book at one time, thereby impeding the flow of production orders to the plant. The formulas themselves were not kept in the best possible condition.

According to Ralph M. Swanson, Vice President, the Acme Visible system permits unlimited access to the data by any number of clerks at one time. All data is now centralized in one place, encouraging better organization and speedier handling of orders. Furthermore, the entire bank of files can be locked at night merely by raising the lower writing shelf.

Why COLUMBIAN CARBON BLACKS* make the greatest stir in the paint industry:

. . . because more and more manufacturers are discovering that Columbian Carbon Blacks give them unsurpassed combinations of jetness with ease of dispersion in lacquers and enamels . . . because Columbian offers top quality, economy and a most extensive product range . . .

*NEO-SPECTRA® MARK II

Standard black for top-quality enamels. Fast dispersion, vehicle seeking.

*SUPERBA®

Medium high blackness. Easy to process and disperse. Economical.

*EXCELSIOR®

All purpose black for paints. Standard blackness.

*STATEX®

For blue grey tints, dark machinery greys.

*MOLACCO®

For bluest tints.

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380 Madison Avenue, New York 17, N. Y.
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For complete information about Columbian Carbon Blacks in three forms—Powder • Beads • Dispersions—mail this coupon, today.

I-8

COLUMBIAN CARBON COMPANY
380 Madison Avenue, N.Y. 17, N.Y.

Name.....
Position.....
Firm.....
Address.....
City.....Zone.....State.....

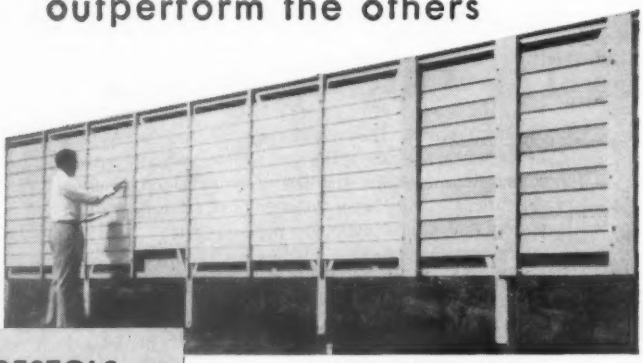
FIVE TESTED and PROVED REASONS

why white and tinted housepaints with

ASBESTOL

EXTENDERS

outperform the others



A view of Carbola test fence

ASBESTOLS
give your housepaints

1. SUPERIOR DURABILITY
2. LEAST DIRT COLLECTION
3. BETTER TINT RETENTION
4. CLEAN COLOR
5. EXCELLENT SUSPENSION

In conventional housepaints, alkyd housepaints, lead free housepaints, latex housepaints—insist upon Asbestol. It outperforms other extenders — and in turn helps your paints outperform other competing brands.

Prompt shipment from conveniently located warehouse stocks in the United States and Canada.

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CHEMICAL CO., INC.
Natural Bridge, N. Y.

Serving the Paint Industry for 55 years.

Branches at: West Springfield, Mass.; Carnegie, Pa.; Butler, Ind.; Minneapolis, Minn.; Bird-in-Hand, Pa.; Durham, N. C.; Montreal, Que.; Toronto, Ont.

MAIL COUPON FOR FREE LITERATURE AND SAMPLES

Carbola Chemical Company, Inc., Dept. P-110
Natural Bridge, New York
Gentlemen: Please send Asbestol literature and samples.

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*Company*_____ *Position*_____

*Address*_____

*City*_____ *State*_____

SEE US AT BOOTH NO. 518 PAINT CONVENTION, WASHINGTON, D. C.

For details write to

Carbola Chemical Co., Inc.

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ALKYL ESTER OF LAC ACIDS

Specially treated and processed for use with nitro-cellulose, ethyl cellulose, maleics, phenolics and other film-forming materials.

As countless formulators have already discovered, Mantrose's ES-45 Shellac Ester improves the gloss, flexibility, adhesion, leveling and ultraviolet light resistance of lacquers. And it's stable . . . highly tolerant to hydrocarbons, ketones and ester solvents.

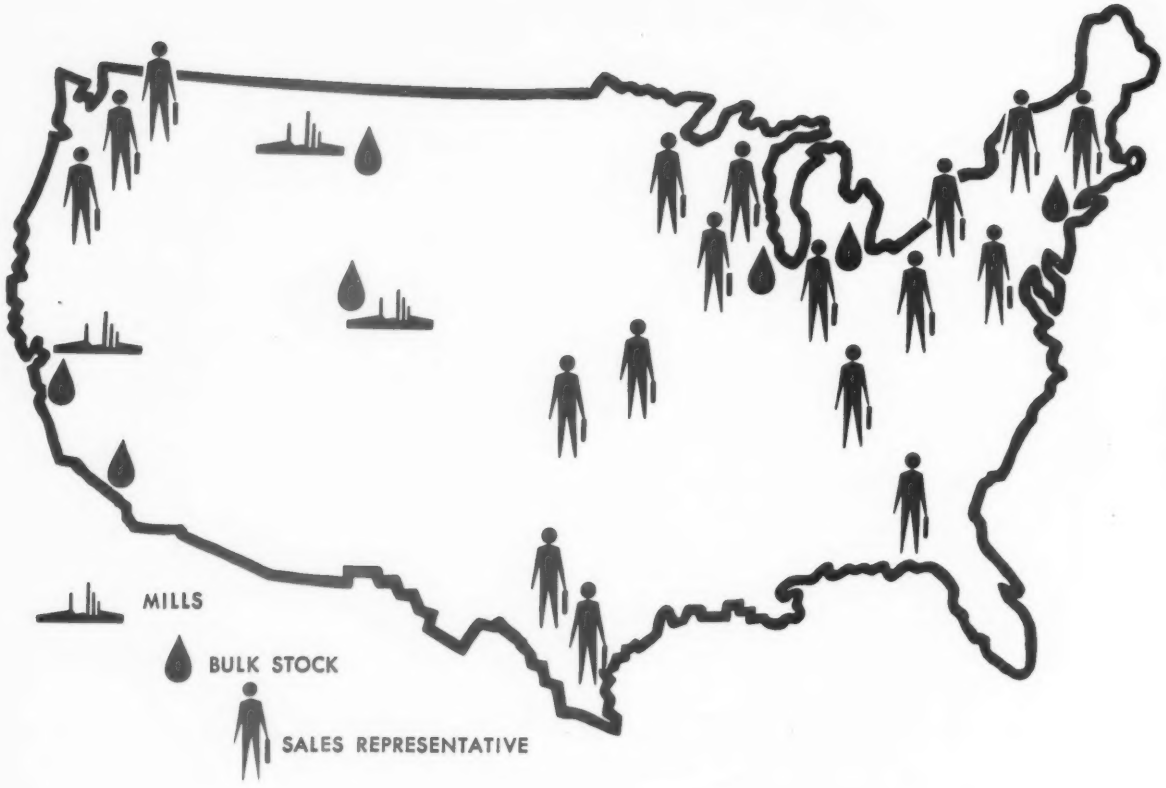
Color Critical—Because of its extremely light color (Gardner Holt 6-7), you can safely use ES-45 in a wide range of coating and ink formulations. Furthermore, you can depend on its quick solvent release to yield films which set up rapidly to a tack-free stage.

Free working samples, technical assistance, and product literature are available on request. Just call or fill out and mail coupon.

The Mantrose *Corporation*

99 Park Avenue, New York 16, N. Y. • Telephone MU 7-2762
Plant address: Attleboro, Mass. • Established 1919

THE MANTROSE CORPORATION
Dept. PVP, 99 Park Avenue, New York 16, N. Y.
I am interested in using ES-45 Shellac Ester for_____
Please send me: ☐ Working sample ☐ Product literature
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____



Only PVO can get Safflower Oil to you so quickly...so economically

PVO mills and bulk stock points throughout the nation assure you immediate delivery and lower freight cost on Safflower Oil

The Pacific Vegetable Oil Corporation has plenty of safflower oil waiting for immediate delivery to you. PVO, the pioneer in safflower oil, has three safflower mills, seven bulk stock points and thirteen drum stock points throughout the nation. This means that you get speedy service and increased savings on your safflower oil freight charges.

PVO mills are located at Richmond, California; Culbertson, Montana; and Sidney, Nebraska. PVO bulk stock points are in New York, Chicago, Detroit, Los Angeles, San Francisco, Sidney, Nebr., and Culbertson, Mont.

PVO . . . *Pioneer in Safflower Oil*

PACIFIC VEGETABLE OIL CORP.

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Nottingham Co.

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R. B. Huber Associates

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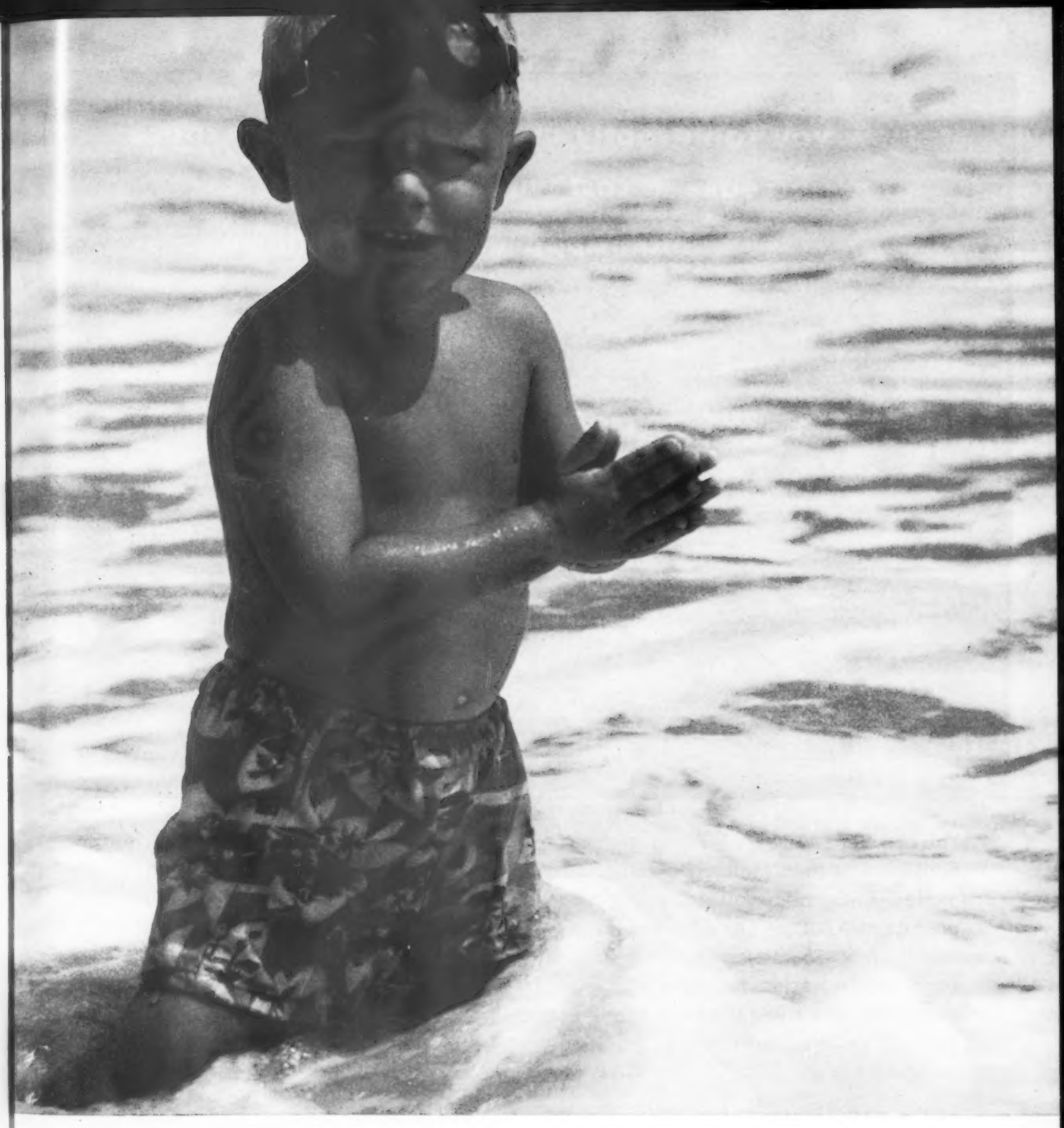


FOAM belongs in the sea...not in paint mixing equipment or paint films. Foam slows down production, makes for difficult filling of paint containers, causes fish-eyes in coatings. FMC's Tributyl Phosphate is an excellent foam depressant...reliable, moderate in cost, effective in concentrations of 1% or less in latex paints.

To order TBP, contact your FMC distributor or call us at MU 7-7400, New York. We'll speed your request to the office nearest you. Write for data, prices and a list of representatives with warehouse stocks.

TBP *a product of* fmc FOOD MACHINERY AND CHEMICAL CORPORATION ®

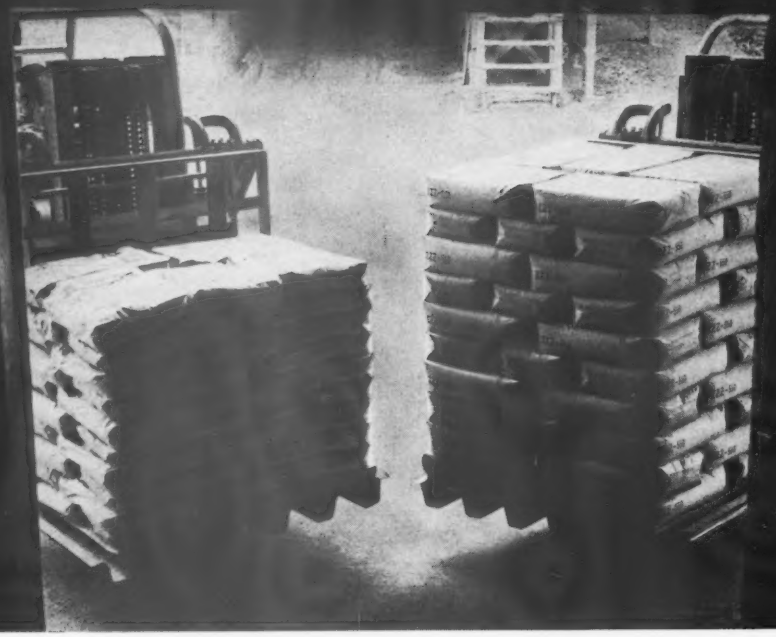
Putting Ideas to Work

Chemicals and Plastics Division

161 East 42nd Street, New York 17, N. Y.

Now you can greatly increase warehouse space* at no increase in cost with...

AZODOX high apparent density zinc oxides



You can store AZODOX in much less warehouse space than required by other zinc oxides. Reason is, you get many more pounds of AZODOX per cubic foot of pigment, up to 65 lbs./cu. ft.! And smaller bags handle easier, faster—stack higher safely—reduce breakage losses—are shaped to give close-packed, unitized shipments.

In the manufacture of AZODOX, an exclusive process removes excess, space-wasting air from between individual particles of zinc oxide. That's all! Actual pigment density and all other desirable properties are unchanged. In comparison with other zinc oxides, high apparent density AZODOX flows freely yet dusts less, increases mixing capacity, disperses readily.

You can get high apparent density AZODOX in five grades of AZO brand lead-free paint pigments: acicular or nodular particle shape. For technical data, just fill in and mail this coupon.

*Pallet load of AZODOX on left above is 30.4 cu. ft. Pallet load of regular zinc oxide on right is 44 cu. ft. Same number of bags; same weight . . . *but a 30 percent saving in space!*

AMERICAN ZINC SALES COMPANY
1515 Paul Brown Bldg., St. Louis 1, Mo.

Please send me technical information about . . .

- ☐ AZODOX high apparent density zinc oxides
- ☐ 15 types of AZO brand zinc oxides

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

American Zinc sales company

Distributors for
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Columbus, Ohio • Chicago • St. Louis • New York

NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

MORSE

PORTABLE ROTATOR
Improved Structure

Structural improvements in the Model #200 portable drum rotator include increased shaft size and the addition of two horizontal channel sections, slotted brackets (for chain adjustment) in the idler reduction housing, a reinforcer for the safety nose piece, and a chain guard on the exposed sprocket.

Morse Mfg. Co., Dept. PVP, 727 West Manlius St., East Syracuse, N. Y.

PSEUDOCUMENE
Bulk Quantities Available

Pseudocumene (1,2,4-trimethylbenzene) is now available in commercial bulk quantities. New end-use applications include trimellitic anhydride, methyl dicarboxylic acids and dimethylcarboxylic acids—all of which have potential in the surface coatings field.

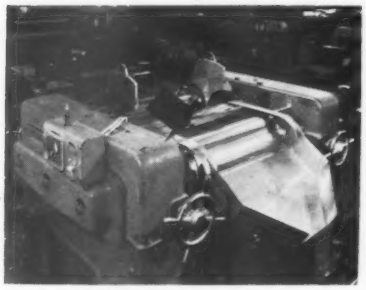
Enjay Chemical Co., Dept. PVP, Room 1903, 15 West 51st St., New York 19, N. Y.

WALKIE-RIDER TRACTOR
Double-Duty Electric

A new electric tractor model, the TSG 12-24, is a combination walkie-rider tractor that is recommended for use where both short runs and long hauls are required.

In walkie use just one of the two 12-volt batteries supplies power through two speeds set for comfortable walking pace. For rider use, with full 24-volt power operating, the high third speed drives the TSG up to 6.25 mph, without load. With full rated load of 10,000 pounds rolling capacity, speed is 3.25 mph. Ultimate drawbar pull is rated at 550 pounds.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Road, Northbrook, Ill.



J. H. DAY CO.

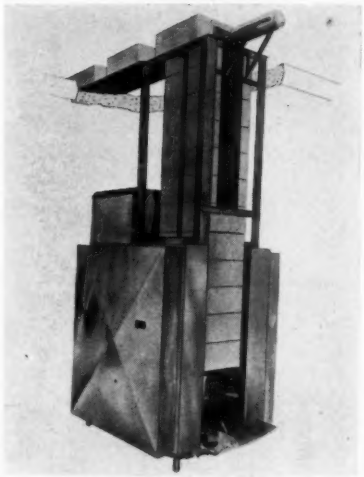
TRANSFER BLADE ATTACHMENT
Movable Blade

A new design transfer blade attachment for three-roll mills is reported to increase production as high as 40 per cent.

Further savings are effected in cleaning costs as a result of the unique design which permits the blade to be swung upward into a position for cleaning.

According to company reports blade life is also increased, approximating 25,000 to 30,000 pounds between sharpenings.

J. H. Day Co., Div. of Cleveland Automatic Machine Co., Dept. PVP, 4932 Beach St., Cincinnati, Ohio.



LATHROP-PAULSON

CARTON ELEVATOR
350 Lb. Capacity

A new automatic carton elevator and vertical compression unit offers a simple means to elevate cartons and discharge them at another floor level or into an elevated storage or accumulating area.

As each carton is fed into the machine it is automatically elevated and held on pivoting storage shelves. As succeeding cartons are elevated they form a vertical stack. This permits use of the machine as a vertical compression unit for cartons as they come out of the case sealer.

The machine has a load capacity of 350 pounds and can handle cartons at speeds up to 20 per minute.

Lathrop-Paulson, Dept. PVP, 2459 W. 48th St., Chicago, Ill.

POWDERED WAX
For Lacquers

A new wax product, Advawax 280-F, is said to have resistance to practically all solvents, acids and alkalis. The finely ground, synthetic powdered wax has a melting range of 280 to 290 degrees (Fahrenheit).

Some of its applications: plastic lubricant and anti-blocking agent; anti-tack agent in adhesives; imparts slip and mar resistance to lacquers.

Advance Solvents & Chemical, Dept. PVP, 500 Jersey Ave., New Brunswick, N. J.

REACTORS
Dimple-Jacketed

New dimple-jacketed reactors are said to save up to 25 per cent in labor and manufacturing costs over conventional jacketing used in the processing industry for heating or cooling fluids under pressure.

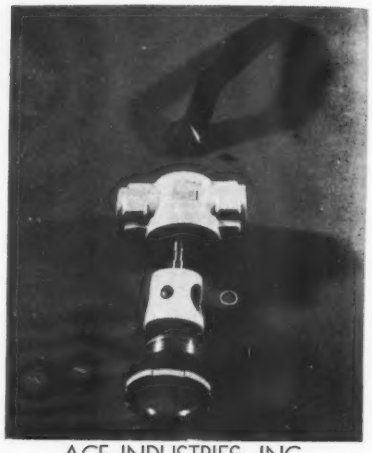
With a 10,000 gallon capacity, these reactors are the first and largest of this type ever built. Made by means of an exclusive low-cost fabrication method developed especially for this application, the reactors are also the first to carry an ASME certification for working pressures up to 162 p.s.i.

Brighton Corp., Dept. PVP, Cincinnati, Ohio.

BALL VALVE
Only Seven Parts

The major design feature of the new industrial ball valve is a "sealing capsule" of conical-shaped Teflon which is molded around the ball that controls the on-off action of the valve. The ball, its handle stem and its sealing surfaces are molded as one unit.

This ball valve, used to control the flow of gases, liquids and slurries, has but seven parts: the



ACF INDUSTRIES, INC.

sealing capsule with its integral handle stem, the valve body, handle, Teflon stem seal (a small washer), a screw-in base plate, lock nut and set screw. All adjustments in the valve are made merely by tightening the base plate.

Rebuilding of the valve, if necessary, can be performed in the line in approximately three minutes, the company claims.

ACF Industries, Inc., W-K-M. Div., Dept. PVP, P.P. Box 2117, Houston, Texas.

COLORANT STABILIZER INGREDIENT
Holds Down Aeration

T.S.7, now available to manufacturers of paint colorants, aids in the suspension of color, helps control the viscosity, aids in creating a more uniform dispersion, and helps hold down the aeration.

All-Phase Color Corp., Dept. PVP, 2619 East 8th St., Los Angeles 23, Calif.

BENZOYL PEROXIDE PASTE
Non-Separating

An improved benzoyl peroxide paste, labeled "New Improved" BZQ 50, in addition to its non-separating quality is fire resistant, has an even consistency which aids accurate measurement, and is completely homogenous—assuring uniform concentration in each application.

The fine particle size provides rapid and complete solubility in polyesters and other monomers and polymers and will never discolor regardless of age or storage conditions, according to the company.

U. S. Peroxygen Corporation, 850 Morton Ave., Dept. PVP, Rihcmond, California.

Weather testing translucent fiberglas for outdoor use in an Atlas Weather-Ometer at the Alsynite Company of America.

Weathering Qualities of Paints
can be pre-determined with speed and accuracy in the
WEATHER-OMETER®

The natural weathering effect of sunlight, moisture, thermal shock and rain is reproduced on a highly accelerated basis in the Weather-Ometer. The cycle to be used is controlled by the Cycle Meter which automatically regulates the length of the exposure to light and moisture under controlled conditions of temperature. Available with automatic control of relative humidity permitting exposures under conditions simulating the formation of dew.

Results are positive and dependable and any test program can be duplicated or repeated at any time.

A few of many users of
Atlas Weather-Ometers:

Radiant Color Co
National Lead Co.
Ford Motor Company
Harrison Paint & Varnish Co.
John Lucas & Co., Inc.
Rust-Oleum Corp.
Benjamin Moore & Co.
Reardon Co.
De Soto Chemical Coatings Inc.
Pratt & Lambert Inc.
Pittsburgh Plate Glass Co.
General Electric Co.
E. I. DuPont de Nemours & Co., Inc.
Glidden Co.
Cook Paint & Varnish Co.
Sherwin-Williams Co.

ATLAS ELECTRIC DEVICES CO.
4114 N. Ravenswood Ave., Chicago 13, Illinois U.S.A.

SURFACE ACTIVE AGENTS
High Solubility

Two new anionic surface active agents, alpha-sulfopalmitic and alpha-sulfostearic acids, have been developed. Both acids, known as Armosul 16 and Armosul 18, are difunctional compounds having a strongly acidic, sulfonic acid group and a weakly acidic, carboxylic acid group within the molecule. Both acids are claimed to have unusual solubility and surface active properties.

Armosul 16 and Armosul 18 are available in pilot plant quantities. They are off-white, slightly hygroscopic powders which are soluble in water and polar organic solvents.

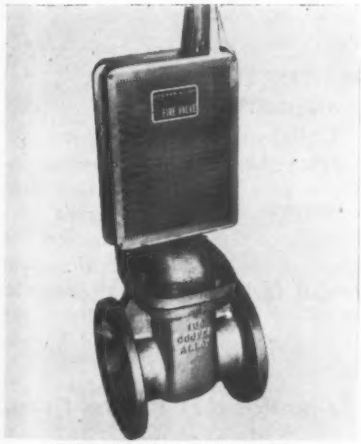
Armour Industrial Chemical Co., Dept. PVP, Chicago 90, Ill.

CUTOFF VALVE
Mounts in Any Position

A new fire protection cutoff valve without counterweights or interior bellows has recently been introduced. The stainless steel valve is a bolted-bonnet gate valve held open against two stainless steel springs by a fusible link. At a preselected temperature the link melts and the springs snap the valve shut, stopping the flow of flammable liquid to fire areas.

The new valve is available in sizes from ½ to 6″ for up to 150 pounds working pressure. Exposed working parts are entirely surrounded by a perforated-metal protective cage on a cast-steel frame. Removal of the cage exposes all working parts for inspection and simple test.

Cooper Alloy Corp., Valve & Fittings Div., Dept. PVP, Hillside, N. J.



COPPER ALLOY CORP.

FOR MIXING OF CAULKING COMPOUNDS OR PUTTY

use PAUL O. ABBÉ Double Arm Paste Mixer

Says the manufacturer of caulking compounds using the Paul O. Abbe' Mass and Paste Mixer shown here:

"Our Paul O. Abbe' Mixer gives us, by weight, 10% above its rated capacity.

"Mixes material in 20 minutes.

"Can be thoroughly and easily cleaned.

"Will handle a maximum batch capacity very capably.

"Machine so constructed that maintenance can readily be performed—glands accessible—packing easily replaced."

Get all the facts regarding these double arm paste mixers. Write today for 12 page Catalog D with full specifications and other data.

PAUL O. ABBÉ INC

389 CENTER AVENUE LITTLE FALLS, NEW JERSEY

BALL & PEBBLE MILLS • DRY & PASTE MIXERS • DRYERS & BLENDERS

ACCURATELY DUPLICATE
BALL MILL
GRINDING ACTION!

McDANEL METAL JACKETED
CERAMIC LABORATORY MILL JARS

Quart, gallon and two-gallon sizes! Easy to discharge, clean! Rubber or neoprene gaskets! Low pickup, longest life! For cradle or roller mills.

Write for Catalog today!

McDANEL Industrial CERAMICS Since 1919

McDANEL
REFRACTORY PORCELAIN COMPANY
BEAVER FALLS · PENNSYLVANIA

TESTING DEVICE
Non-Destructive

A non-destructive testing device has been developed for accurate gaging of non-conductive coatings on aluminum and its alloys. The new instrument, called the Type EC Permascope, measures 9″ x 6½″ x 6½″, is portable and can be used wherever there is a 110 volt ac outlet.

In addition to gaging non-conductive coatings on non-ferrous base metals (such as aluminum and copper), the device offers a non-destructive means of measuring the thickness of a non-ferrous metal on a non-ferrous base, the thickness of a non-ferrous coating on a non-conductor and the conductivity of a non-ferrous metal.

Twin City Testing Corp., Dept. PVP, 533 South Niagara St., Tonawanda, N. Y.

UNCALCINED CLAY
High Hiding

An uncalcined clay that has unusual hiding qualities for paint applications has been developed and is in full-scale production. Called Al-Sil-Ate NC, the product is a white, bright clay that operates most efficiently as an extender of titanium dioxide pigments. This uncalcined clay has a relatively low oil absorption and produces paint films with excellent physical properties, according to the company.

Samples for laboratory work and production runs are available on request.

Southern Clays, Inc., Dept. PVP, 33 Rector St., New York 6, N. Y.

POLYESTER RESIN
Powdered Form

CoRezyn 2, a monomer free unsaturated isophthalic polyester resin, is now available in powdered form. The new form gives very fast solution in styrene monomer to produce a resin with exceptional adhesion to fiberglass reinforcement. Stability problems are eliminated since the resin is stable indefinitely until dissolved in styrene.

Commercial Resins Corp., Dept. PVP, 1250 W. 7th St., Saint Paul, Minn.

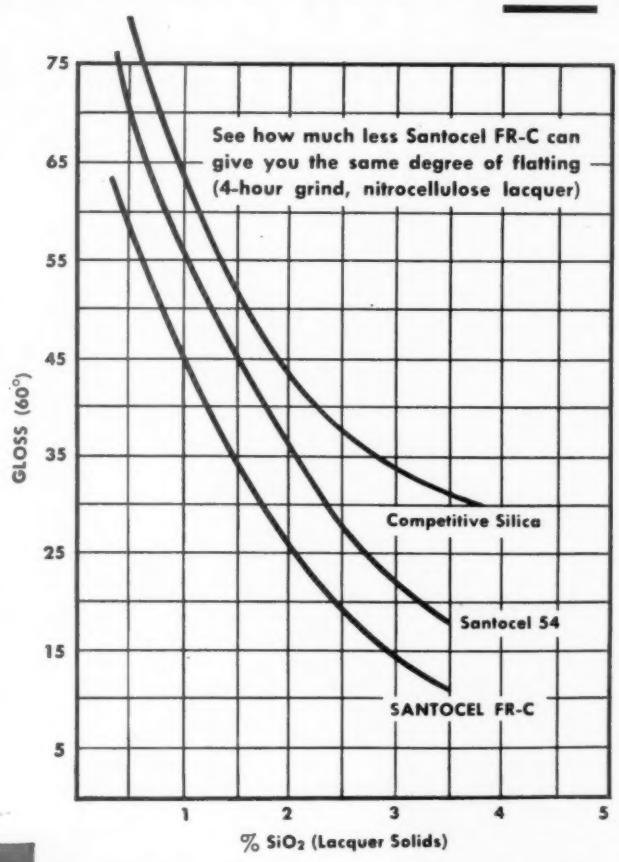
More clear lacquer and varnish is made with Santocel® than with all other silica flatting agents, because of

3 INDUSTRY-PROVEN ADVANTAGES WHICH SANTOCEL FR-C OFFERS YOU:

1 Cuts flatting costs from 20 to 40% because less is needed to do the job; provides the desired degree of flatting, from a matte finish to semigloss.

2 Helps produce a completely transparent, mar-resistant film. Free-flowing SANTOCEL FR-C is easy to handle, easy to use in ball mills and other standard dispersing equipment.

3 Stays in suspension for long periods; whatever settling may take place may be easily re-dispersed. In *pigmented* coatings, the fine aerogel particles actually act as an anti-settling agent for conventional color pigments (as little as 1.0% on your pigment weight can help maintain a stable pigment dispersion).



SANTOCEL FR-C offers you major proven advantages in oil-based varnishes, nitrocellulose and vinyl lacquers . . . in baked-enamel outside finishes for aluminum siding, and in similar coatings. For Technical Data Sheets on lacquer and varnish flatting and a test sample of SANTOCEL FR-C, call your nearby Monsanto sales representative or distributor, or write:

MONSANTO CHEMICAL COMPANY
Inorganic Chemicals Division,
Dept. 3032F,
St. Louis 66, Mo.

Monsanto®

ANOTHER PRODUCT OF REICHHOLD RESEARCH

NEW! POLYLITE POLYESTER METAL FINISHES

Now, you can offer maximum metal surface protection with a durable plastic coating. Formulate "self-baking" protective and decorative paints with RCI POLYLITE polyester resins.

You can offer ease of application. Coatings 15 mils thick can be readily sprayed on vertical surfaces **in one application,** using a dual spray gun. The paint cures rapidly to a durable, chemical-resistant finish.

Comparative tests show these polyester paints to be equal to or better than other metal finishing systems. And the cost-per-mil-per-square-foot is lower!

Paints made with POLYLITE resins are extremely versatile, may be developed to perform over a wide range of requirements. They require no different treatment in manufacture from conventional flat wall paints or gloss enamels.

Write for complete information, suggested formulations and data on metal surface preparation and priming, to: Reichhold Chemicals, Inc., RCI Building, White Plains, N. Y.

RCI

Creative Chemistry ...Your Partner in Progress

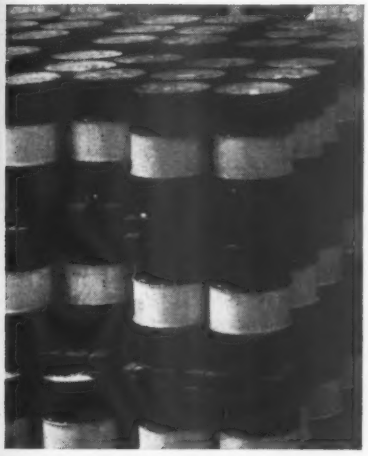
REICHHOLD

News of Nitrocellulose...

A BULLETIN FROM THE CELLOFILM CORPORATION

• Should you buy in solution? What are your storage problems? • How can you achieve uniformity from batch to batch? • Some practical thoughts about nitrocellulose . . .

Nitrocellulose has been with us for so long that we may overlook its versatility as a basic raw material. The purchase of nitrocellulose *in solution* . . . for use as a *prime* raw material in the production of lacquers, coated textiles, inks, adhesives, plastics, etc. . . . is a constantly growing trend. There are good reasons . . . reasons well worth considering for your nitrocellulose requirements.



When nitrocellulose is delivered in solution, whether by tank truck or in drums, the need to mix *your* own solution is eliminated. This means that it is not necessary to set aside a portion of your plant, and *part* of your production time, to process nitrocellulose. The employees who were formerly engaged in processing the nitrocellulose can be assigned more profitable and productive functions.

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PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Coating Compositions

U. S. Patent 2,997,398. Max Kronstein, New York, and Joseph Eichberg, Great Neck, N. Y., assignors, by mesne assignments, to American Lecithin Company, Atlanta, Ga., a corporation of Georgia.

A liquid coating composition consisting essentially of boiled linseed oil with zinc salt reaction product of commercial lecithin (containing about 8% zinc) combined with red lead, using 65 parts of red lead for each 22 parts of linseed oil diluted with 19 parts of mineral spirits, said oil being lighter in color and high in light transmission.

Thixotropic Oil Vehicle

U. S. Patent 2,996,396. Herbert M. Schroeder, Williamsville, Robert L. Terrill, Snyder, and Hans M. Hauge, Buffalo, N. Y., assignors to Spencer Kellogg and Sons, Inc., Buffalo, N. Y.

An oil vehicle having thixotropic characteristics prepared by heating the oil selected from the group consisting of unbodied drying oils, unbodied semi-drying oils, bodied drying oils, bodied semi-drying oils, a liquid copolymer of a vegetable drying oil with a benzenoid vinyl monomer selected from the group consisting of vinyl benzene and vinyl toluene, and a liquid copolymer of a vegetable semi-drying oil with a benzenoid vinyl monomer selected from the group consisting of vinyl benzene and vinyl toluene in the range of 200°F. to 450°F. with from about 0.1% to 5% of ethylenediamine based on the weight of the oil, for from about 0.5 hour to about 6 hours until the oil has acquired thixotropic characteristics greater than about 5/4.5.

Protective Coatings

U. S. Patent 2,995,461. James L. Boicey and Charles M. Browne, Toledo, Ohio, assignors to Libbey-Owens-Ford Glass Company, Toledo, Ohio, a corporation of Ohio.

In a method of forming a film on selected areas only of a support body, the steps of placing on the support body over the areas where it is desired to prevent the formation of the film a suspension, in a lacquer-like vehicle comprising a mixture of an organic anhydrous liquid and a miscible binder, of a finely milled inorganic thermally stable water soluble masking material that is inert to said support body under heat, which suspension forms a post-firing residue impervious to the filming material but readily removed by water washing.

Paint Tinting Color Bases

U. S. Patent 2,996,397. Charles William Secker, Jr., Sharon Hill, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware.

A fluid multi-purpose paint tinting color base consisting essentially of (A) a dispersed pigment composition, as the principal component by weight, consisting essentially of at least one paint pigment, (B) about 5–40% of an oleaginous non-volatile organic vehicle for said pigment composition consisting essentially of dehydrated castor oil and soya lecithin in the proportion of 0.05 part to 2 parts of lecithin per part by weight of the dehydrated castor oil, and (C) about 1–15% of a liquid non-ionic surfactant composition consisting essentially of at least one water-dispersible polyether surfactant having a polyethanoxyethanol substituent linked through an ether oxygen atom to a ring carbon atom of a 5 to 6 member organic ring containing at least 4 ring carbon atoms, any atom in the ring other than carbon being a single ether oxygen atom, said organic ring being further characterized in having a hydrophobic alkyl substituent of at least 8 carbon atoms linked thereto.

Emulsion Paints

U. S. Patent 2,996,395. Kenneth E. Jackson, Bethel, Pa., assignor to Esso Research and Engineering Company, a corporation of Delawar..

A coating composition in the form

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of an emulsion comprising an aqueous solution of a protein as the continuous phase, and a hydrophobe disperse phase comprising as its predominant ingredient a liquid sodium polymer of butadiene, which composition is characterized by forming a water washable dry coating.

Resinous Polyhydric Phenol

U S Patent 2,998,398. Sylvan Owen Greenlee, 343 Laurel Drive, West Lafayette, Ind.

A substantially gel-free, resinous polyhydric phenol having at least 4 phenolic hydroxyls per molecule and having the formula

where A is the organic radical of an esterified alcohol which, prior to esterification, contains 1-3 alcoholic hydroxyl groups, X is a phenolic ether radical and R is a polycarboxylic acid radical connected to A through an ester linkage.

Coatings For Masonry

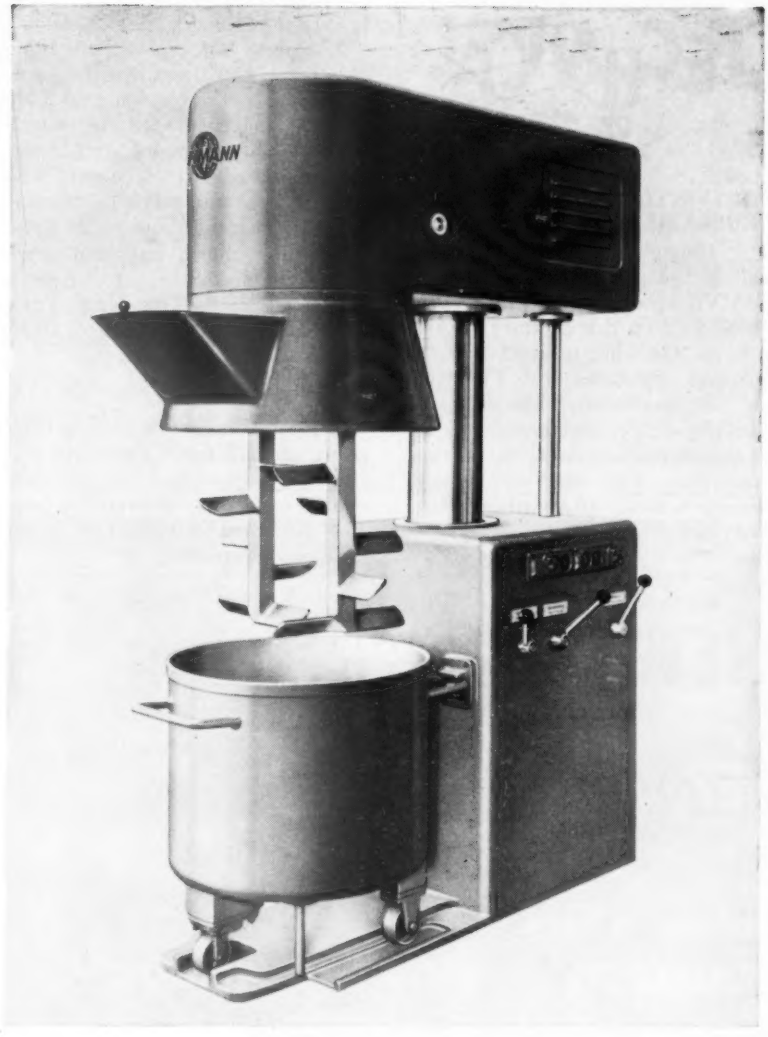
U. S. Patent 2,995,534. Alfred Byron Adams, Melrose, and Tadius T. Sadowski, Salem, Mass., assignors to W. R. Grace & Co., Cambridge, Mass., a corporation of Connecticut.

A composition for forming decorative face coatings for masonry building units which coatings are characterized by superior hardness, scratch resistance, and discoloration resistance, said composition being a substantially air-free polyvinyl chloride resin mixture containing as its sole polymerized resin constituent a paste-grade polyvinyl chloride resin, between 40 and 80 parts of a polymerizable plasticizer selected from the group consisting of polyethylene glycol dimethacrylate and the diglycidyl ether of bis (4-hydroxyphenyl) dimethyl methane, between 0.73 and 6 parts of a compatible catalyst for said polymerizable plasticizer, between 17 and 60 parts of 2-ethyl hexyl diphenyl phosphate, and bet ween 316 and 700 parts of sand having a mesh size in the range of 50 and 200, said composition having a viscosity between 6000 and 9000 centipoises and said parts being based on 100 parts by weight of said resin.

Castor Oil-Based Urethane Coatings

U. S. Patent 2,994,674. George O. Rudkin, Jr., Wilmington, and Joseph E. Wilson, Newark, Del., and Michael A. Dunn, Philadelphia, Pa., assignors to Atlas Powder Company, Wilmington, Del., a corporation of Delaware.

A coating composition comprising the reaction product of an aromatic diisocyanate and the alcoholysis product of castor oil with a polyoxypropylene ether of a hexitol.



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TECHNICAL Bulletins

POLYVINYL ACETATE PROPERTIES

A 40-page comprehensive manual on the properties and uses of GELVA, polyvinyl acetate, provided data on this product's applications in building products, paints, coatings, adhesives, etc. The manual contains detailed specifications and physical characteristics on all homopolymer and copolymer resins, emulsions, solutions, and spray-dried powders. **Shawinigan Resins Corp.,** Dept. PVP, Springfield, Mass.

CENTRIFUGAL PUMPS

The new 8-page bulletin 105C illustrates and describes the complete line of single-stage, double suction, horizontal split case pumps with capacities ranging up to 6000 G.P.M., heads to 380 feet. The bulletin contains sectional photos, selection charts, dimensional data, limitations chart, and engineers-architects specifications. Aurora Pump Division, **The New York Air Brake Company,** Dept. PVP, Aurora, Ill.

PAINT EQUIPMENT

A 7-page booklet describing their paint and ink mills, screening machines, mixers, can tilters, and related equipment is available from **J. M. Lehmann Co., Inc.** Dept. PVP, Lyndhurst, N. J.

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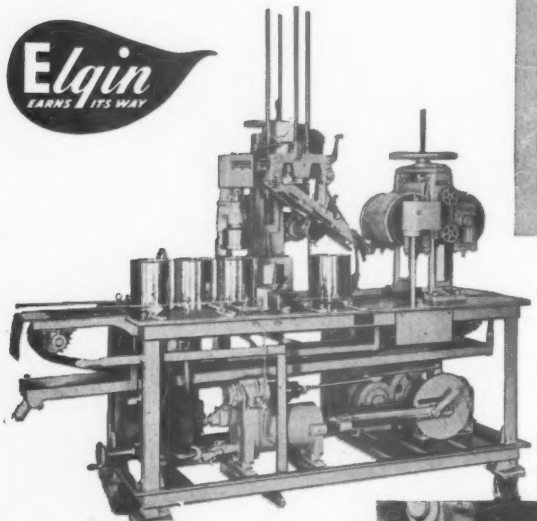

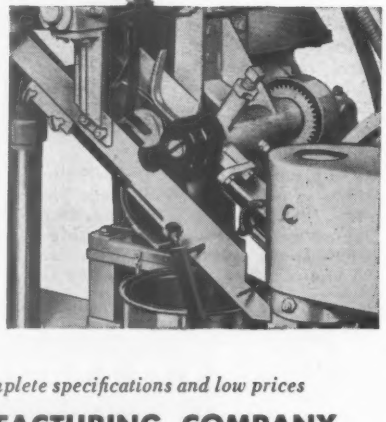

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FLATTING AGENTS

"Performance of Syloid 978 in the Preparation of Flatted Nitrocellulose Lacquers Via 'Stir-In' Technique" is the title of a new bulletin which incorporates both laboratory and plant-scale data. It is available from **W. R. Grace & Co.,** Davison Chemical Div., Dept. PVP, Baltimore 3, Md.

PLASTICIZING COATING RESINS

A 54-page technical bulletin titled "Plasticizers in Protective Coatings" contains more than 150 suggested starting formulations for 19 different types of cellulosic, rubber, vinyl, and other resin coatings. The bulletin includes 10 tables of comparative evaluations of plasticizers in as many different coating systems. Copies of Bulletin No. PL-327 are available from Mr. Robert Hogan, Organic Chemicals Div., Dept. PVP, **Monsanto Chemical Co.,** 800 N. Lindbergh Blvd., St. Louis 66, Mo.

DUST CONTROL

A number of methods for controlling industrial dust and fumes are described in a new 20-page bulletin which lists the basic essentials comprising a typical dust control system and explains the advantages available through proper dust control. The "CO" cloth tube collector for high-temperature, corrosive-gas applications is described. Ask for Bulletin 922A. **Pangborn Corp.,** Dept. PVP, Hagerstown, Maryland.

THICKENING AGENTS

A 4-page technical information sheet on the use of thickening and stabilizing agents Allegal 20 and 30 includes a description of the typical properties, applications and methods of processing; viscosity curves showing their behavior in water; and several formulating examples of their use for gelling, suspending, stabilizing, thickening, etc. For a copy, ask for T.I.-1025. **Minerals and Chemicals Philipp Corp.,** Dept. PVP, Menlo Park, N. J.

CHEMICALS LIST

A 16-page bulletin, 100-E, listing and describing 108 organic and inorganic chemicals for industry is available from **Hooker Chemical Corporation,** Dept. PVP, Niagara Falls, N. Y.

HEATING AND COOLING

Technical Data Bulletin No. 356 contains information on heating, cooling and heat transfer. The 24-page book contains an instantaneous LMTD chart, tells how to figure heating load and select heating surface, gives pressure drop shortcuts. **Dean Products, Inc.,** Dept. PVP, 1042 Dean St., Brooklyn 38, N. Y.

STATISTICS HANDBOOK

The fourth edition of a statistical compilation of official figures on the chemical industry is now available. Entitled "Statistical Summary No. 4," the publication brings up to date through 1960 statistical information contained in the "Chemical Statistics Handbook" which was published in 1960. Copies of the publication are available from Mr. Richard Lambert, Dept. PVP, **Manufacturing Chemists' Association, Inc.,** 1825 Connecticut Ave., N. W., Washington 9, D. C. at $1.00 per copy.

ALIPHATIC ORGANIC CHEMICALS

A new 12-page catalogue of aliphatic organic chemicals lists some 150 different products along with specifications and typical applications. A page is devoted to the chemical composition of the fatty acids as determined by gas chromatograph. **Armour Industrial Chemical Co.,** Dept. PVP, Chicago 90, Ill.

ROTARY VALVES

A 4-page bulletin, No. N-261, describes precision-built rotary valves for feeding dry bulk materials or for use as an air seal. The bulletin includes application photographs, specifications, dimension charts, and diagrams. **Day Co.,** Dept. PVP, 810 Third Ave., N.E., Minneapolis 13, Minn.

SENSING DEVICES

This 4-page brochure on sensors describes how optical, infra-red, magnetic, electro-magnetic, and nuclear devices are used to inspect, control, measure, validate, and detect. Includes case histories showing how the devices are used. Ask for DFI Progress Report on Sensors. **Designers for Industry, Inc.,** Dept. PVP, 4241 Fulton Parkway, Cleveland 9, Ohio.

SAFETY GUIDE

An 8-page pamphlet on recommended safe practices and procedures for entering tanks and other enclosed spaces sets forth three basic principles to be used in avoiding the hazards inherent in tank entry.

The pamphlet suggests a sample work permit for employees entering the tank or enclosure and also recommends tools and protective clothing needed by employees.

Ask for pamphlet SG-10. **Mfg. Chemists' Assn.,** Dept. PVP, 1825 Connecticut Ave., N. W., Washington 9, D. C. Price $0.30.

CONSTANTS AND TABLES

An 8-page handy reference of technical data frequently required in plant operation includes engineering constants, short cut tables and formulas. The booklet is available from The Falcon Manufacturing Div., Dept. PVP, **First Machinery Corp.,** 211 Tenth St., Brooklyn 15, N. Y.

VISCOSITY CONTROL SYSTEMS

Bulletin No. V-1225 describes an automatic viscosity control system for flexographic and rotogravure printing. The basic system is widely used for all types of finishing applications. **Norcross Corp.,** Dept. PVP, 247 Newtonville Ave., Newton, Mass.

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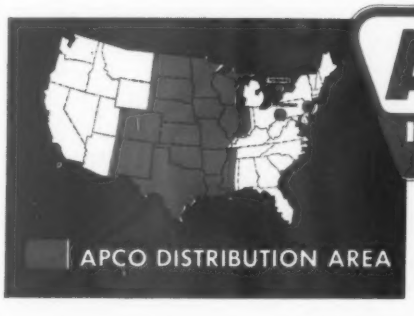

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SOVIET and CZECH ABSTRACTS

Stability of Polyethylphenylsiloxane Lacquers in Extended Storage.

A. F. Moiseev. Lakokrasochnye Materially i Ikh Primenenie, 1960, No. 5, 58-61.

Examination of electro-insulating polyethylphenylsiloxane lacquers after a 2-3.5-year storage in glass and metallic vats gave the following results: (1) The initial storage period (1-1.5 years) decreases the viscosity of the lacquer; the viscosity drop is more pronounced with lacquers whose initial concentration was high. Subsequent years of storage have no effect on the viscosity. The rapidity of the viscosity drop during the initial stage is higher when a siccative is present (Pb-Mn linoleate). (2) In the absence of the siccative, no appreciable change in the physico-mechanical and di-electric characteristics of the lacquer is apparent after a storage period of 3.5 years. (3) In the presence of a siccative, however, a residue precipitate forms, and the lacquer is unusable for most applications already five to six months of storage, with changes toward darkness occurring. It is suggested that lacquers containing siccative be stored not longer than three months. The three polyethylphenylsiloxane lacquers tested were EF-1, EF-3 and EF-5.

Protection of Underwater Parts of Ships, and of Surfaces Exposed to Elevated Humidity, by Oil-Free Anticorrosion Coltings.

E. I. Grishin and M. E. Birinberg Lakokrasochnye Materialy i Ikh Primenenie, 1960, No. 6, 49-51.

The paper characterizes two types of coatings: (1) ethinol paints which dry in 3-4 hours at 18-20°C. Tthinol lacquer is a solution of acetylene-derivative polymers (divinylacetylene, for example) in xylene, stabilized by addition of resinous anti-oxidants or anti-polymerization agents. (2) New, water-stable mastic coatings have a petroleum base, and petroleum hydrocarbons (oxidized or non-oxidized petrolatum) as binder; these non-drying pastes are recommended for wide use.

Synthesis of Styrene-Butadiene Latices and Their use for Paint Preparation.

A. B. Peizner et al. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2, 7-12.

Investigations carried out at the All-Union Research Institute for Synthetic Rubber, aimed at better understanding of the characteristics of latex synthesis, suggest that the optimum proportion of butadiene to styrene is 35:65, and 40:60; with the use of emulsifier, full conversion (100%) of monomer was attained without any additional operations (deodorization and concentration). The products (latices SKS-60 and SKS-65) are suitable for use on the paint industry, and the properties of their films are comparable to those of US or West German latices. When styrene is replaced in the synthesis with alpha-methylstyrene, polymerization time is longer (1.0 hours), the product has a stronger odor, and it is necessary to use additional steps in the synthesis. The paper gives the compositions and manufacturing technology for paints prepared from these latices; production may be carried out in existing plants. The resulting latex paints are easily soluble in water, and applicable with brush or spray gun on wood and other surfaces, to give a flat finish. As regards rapidity of drying, stability to water, and hardness of coating, the prepared latex paints are an improvement over oil paints. Both latices were also used successfully in compositions for priming metallic surfaces before painting.

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Determination of Insulating Properties of Coatings from their Ohmic Resistance

P. I. Vasserman and V. V. Chebotarevskii. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2, 35-44.

The described new method of determining insulating properties of paint and lacquer coating films is based on measurement of ohmic resistance of free films upon their wetting; the method eliminates the difficulties inherent in the author's previously employed method (see *Kolloidnye Zhurnal*, 1959, 392). The relationships between film resistance and the characteristics of their insulating properties are studied by other (independent) methods and, partially, from the vapor permeability and water swelling of films. The paper describes the effect of some factors (film-forming substance, film thickness, amount of pigment) on film resistance during moisturizing in distilled water. Paint films are considered as submicroscopic capillary systems; their structural density is determined by the chemical nature of the film-forming substance, and by the amount and degree of dispersion of pigment. The premeation of moisture into film by methods of capillary flow and diffusion is considered. The authors conclude that coatings which possess low insulating properties and which are characterized by low resistance and higher vapor permeability, have poor protective characteristics.

Determination of Specific Surface of Powders.

By G. Loskiewiczova. Przemysl Chemiczny, 40 (March 1961), 18-22.

The purpose of determining the degree of grinding is a) quality control in mill operation, b) to examine the potential possibilities of a particular powder determined by its specific surface which affects reaction velocity. The knowledge of the relationship between specific surface and granulation analysis permits to control the mill operation. The equation, proposed by author for the calculation of specific surface, is based on the assumption that the grain distribution obeys a logarithmic relationship (given in paper), and that the latter holds for a majority of granular analyses. When grain shape differs from the one assumed, the equation may be modified by a factor whose introduction, however, leads to results lower than the real ones. The method is held to suffice for plant control of grinding operations, however.

Polarographic Analysis of Pigments.

E. A. Navyazhskaya and L. N. Flegontova. Lakokrasochnye Materialy i Ikh Primenenie, 1960, No. 5, 75-58.

A rapid (2-3 hours) method of polarographic determination of zinc in rutile, and of lead, cadmium and copper in zinc whites. The simple method employs a solution of ammonia, containing ammonium chloride, as follows:

$$ZnCl_2 + 4NH_4OH \rightarrow [Zn(NH_3)_2](OH)_2 + 2NH_4Cl + 2H_2O$$

$$[Zn(NH_3)_2](OH)_2 \rightleftharpoons [Zn(NH_3)_2]^{\cdot\cdot} + 2OH'$$

$$[Zn(NH_3)_2]^{\cdot\cdot} + 2e + Hg \rightleftharpoons Zn(Hg) + 2NH_3$$

Anti-Corrosive Protection of Exhaust Pipes of Cottrell Filters

S. E. Chernenko and P. I. Prokhorov. Khimicheskaya Promyshlennost', December 1959, 709.

Following surface preparation, the authors suggest application of "grafalit" to the inside surface of Cottrell filter exhaust pipes. Grafalit is a mixture of 1 kg Bakelite lacquer with 0.4 kg powdered graphite (calculated for 1 square meter of coated surface); the graphite is diluted to suitable concentration with about 150 g ethanol. Grafalit application should be repeated every four months. (In Russian)

Synthetic Resins from Arylglycide Esters. Communication II: Synthesis of Resins from Diglycide Esters and Polyatomic Aliphatic Alcohols.

M. F. Sorokin, A. M. Laguzina, and Zh. T. Korkishko. Lakokrasochnye Materialy i Ikh Primenenie, 1960, No. 6, 1-4.

Description of synthesis of soluble lacquer resins from diglycide esters of

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resorcin, dioxydiphenylpropane and ethyleneglycol, or diethyleneglycol, carried out at temperatures of 50°, 60°, or 70°C, in the presence of a catalyst (solid NaOH, 0.6% of weight of initial reactants); the molecular ratios of esters and alcohols were 1:1, 1.5:1, and 2:1. The effect of temperature, molecular ratios and structure of some arylglycide esters and alcohols on the reaction was investigated. Films, based on these resins, have satisfactory mechanical properties, and are stable to water and chemicals. Films from glycide esters and diethylene glycol have higher resistance to water and acids than films based on glycide esters and ethylene glycol. The molecular weights of the resins prepared varied from 400-1,100. The resins are suitable for use as binders or impregnating agents, as additives to other binders, or in manufacture of epoxies (not containing solvents).

Problems of Protecting Nitrolacquer Films against Mold Attack.

By K. Zlnay and S. Medricka. Chemicky Prumysl, 36 (March 1961), 165-7.

A study of possible protection of painted nitrolacquer films against molds, by application of fungicides. The following compounds were tested for effectiveness: pentachlorophenol, phenyl mercuriacetate, tetramethyl thiuramdisulphide, "Kaptax", and zinc (II)-dimethyldithiocarbaminate. The three first-named compounds were found effective; of these, phenyl mercuriacetate is toxic. In concentrations over 2%, pentachlorophenol protected nitrolacquer-coated furniture for one year without signs of mold attack (3% solution was used). Tetramethyl thiuramdisulphide is equally effective.

Test Fence Results Show That ZnO Gives Latex Paints Greater Chalk Resistance And Better Tint Retention

Here is a portion of a research report recently released by the American Zinc Institute.*

"Latex paints formulated with an acrylic modified PVA emulsion stable in the presence of zinc oxide were exposed in white, gray and blue tints over a number of substrates both primed with a conventional quality house paint primer and self primed. The PVA and the acrylic systems in the same shades of white, gray and blue, were formulated as controls and were applied according to manufacturer's recommendation over similar substrates. *After fourteen months' exposure the latex systems containing zinc oxide were more chalk resistant and demonstrated better tint retention than those systems without zinc oxide.* The latex paints applied over zinc free oil primers showed a higher susceptibility to mildew than when applied as self primed systems."*

*For a complete copy of the AZI report on house paints write to The American Zinc Institute, 292 Madison Ave., New York 17, N. Y. and ask for Technical Letter No. 2.

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Unsaturated Organo-Silicio Resins and Properties of Lacquers Prepared from their Basis.

By D. N. Andreev, I. S. Okhrimenko, A. E. Pinchuk, and V. P. Lyutyi. Zhurnal Prikladnoi Khimii, 34 (March 1961), 584-8.

The authors prepared the following organo-silicon di- and polyesters of fumaric acid: bis(trimethylsilylmethyl) fumarate, and poly(dimethylenetetramethyldisiloxane)-fumarate. The former is a colorless liquid. The polyester was synthesized by polycondensation of a potassium salt of fumaric acid with symmetric bis(chloromethyl)tetramethyldisiloxane in a solution of dimethylformamide, with a 63.5% yield. The product is a reddish-brown, thick mass soluble in a number of organic solvents at room temperature (insoluble in petroleum ether, benzene and water even on heating); the authors have not succeeded to prepare a colorless polyester of this type. One of the products (polyester) was employed in preparation of lacquers for the purpose of studying their film-forming properties and those of their films. The polyester mixes well with styrene in any ratis. Insoluble films are formed from this lacquer upon heating over 100°C, with excees styrene and catalyst. The amounts of three-dimensional polymer formed increase considerably when even small quantities of initiator are used (1% cyclohexanone peroxide); this indicates that the polymerization process taking place is oxidative polymerization (in addition to initiator-catalyzed polymerization). The rate of conversion is much faster at 200°C. The thus prepared films are elastic, and posses low hardness.

Adhesion of Polytrifluorochloroethylene Coatings to Metals

T. N. Nikolaeva and N. S. Kudryavtseva. Khimicheskaya Promyshlennost', December 1959, 668-672.

Polytrifluorochloroethylene ("Fluoroplast-3") possesses good dielectric properties, is chemically inert to acids and bases of all concentrations, and stable to strong oxidants; it is a suitable protective coating for metallic surfaces and instruments used in agressive media, as well as an electrical insulator. As a low-polar polymer, the adhesiveness of its film to metal is determined not only by polar interaction between coating and surface but also by the presence of a double electrical field. The authors report on their investigation of the adhesiveness of polytrifluorochlorochloroethylene coating to metal. The following parameters were studied: effect of nature and amount of pigment and filler; the number of primer coats containing filler or pigment; the nature of the metallic surface; supplementary heating of coating; coating thickness;

temperature and length of time of protection. The metallic surfaces tested were various aluminum and steel samples. From the discussion and tabulated results, the following recommendations are made: the suggested thickness of polytrifluorochloroethylene coating film is 160-180μ; the first four coats should be applied from a suspension pigmented by Cr oxide (25% of weight of dry residue of suspension); the coated material should be heated for 5-6 hours at 230°C. (In Russian)

Bitumen Coatings from Plasticized Rubrax.

A. G. Khanlarova. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2, 32-35.

The purpose of the studies was to exploit the relatively good protective powers of petroleum bitumens for steel constructions of the Kaspic Sea petroleum industry, by increasing their low plasticity and impact resistance. The latter was improved by the addition to bitumen of such plasticizing agents as mineral oils which, however, lowered the softening temperature to 70°C. When petrochemical plasticizers were added to Rubrax, the resulting melting temperature lay over 100°C, and the impact resistance reached 50 cm (in U-1 apparatus, at 0°C). The nature of Rubrax plastification depends also on the chemical composition of plasticizer: aromatic hydrocarbons are less effective than hydrocarbons of the naphthenic and paraffin series. A cold-stable bitumen composition is described, prepared from mixture of Rubrax and petrolatum whose softening temperature lies above 100°C, with impact resistance at 50 cm. The active plasticizing element of petrolatum are hydrocarbons of the naphthenic series. In 1960, one million square meters of sea-exposed petroleum industry metallic structures were protected by this bitumen composition in the USSR. Tests have shown that under advantageous conditions (proper preliminary treatment of surface, and suitable technology of application), the coating described offers protection for a period of four years.

Coatings from Polyurethanes.

A. A. Blagonravova and I. A. Propina. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2, 3-7.

A report on investigation in the area of synthesis of polyisocyanates for two-component lacquers, and of "blocked" isocyanates for one-component lacquers. Polyisocyanates were prepared by reacting 2,4-toluelene-diisocyanate with various polyatomic alcohols (diethyleneglycol, 1,2,-propyleneglycol, triethyleneglycol, hexanetriol, glycerine, etc.) The naturally dried coatings of two-component lacquers, prepared from these polyisocyanates and hydroxyl-containing polyesters, have properties similar to those of coatings based on 2,4-toluelenediisocyanate; although polyisocyanates with three- and four-atomic alcohols give films of considerably higher hardness than those with two-atomic alcohols, they are not recommended inasmuch as the lacquers on their basis are unstable and difficult to manufacture technologically. "Blocked" isocyanates were prepared from 2,4-toluelenediisocyanate, phenol and various polyatomic alcohols, in two reaction steps. The thermostability of "blocked" isocyanates corresponds to theoretically calculated values; they afford a possibility to prepare single-component lacquers with these average properties: impact stability 50 kg/cm, film hardness 0.75-0.92; water stability 40-90 days (at 20°C), or 3-15 hours (at 100°C). The lacquers are suitable for application as high-temperature-hardening coatings for cables, lead wires, etc.

Investigation of Perchlorovinyl Coatings in Tropical Climate

M.I. Karyakina. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2 44-48.

A study (1956-60) of Soviet-made perchlorovinyl coatings, and of their compatibility with various types of primers, in the tropical conditions of south China. The PKhV-715 enamel was found superior to all other perchlorovinyls, and is recommended in systems with a phenolic or butylmetacrylic primer. None of the compositions are described as to their constitutent parts.

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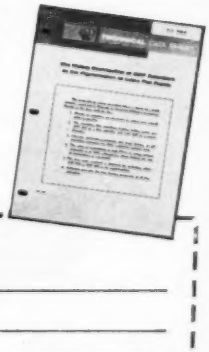

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Use of Polyesteracrylates as Film-Forming Substances.

Ya. L. Raskin, V. Yu. Erman, K. P. Belyaeva, and A. A. Berlin. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 2, 21-26.

Polymerization of the following classes of polyesteracrylates was studied: esters were two, four, and six metacrylic groups. On air, no polymerization proceeds if only initiator is used; when using an accelerator (a metallic salt such as cobalt linoleate or naphthenate) in addition to the initiator, polymerization proceeds rapidly on air after an initial delay (the induction period is 20-40 minutes). Film hardening is accelerated by irradiation with UV or IR source. The following optimum amounts of initiator and accelerator produced a hard, three-dimensional film: 2% benzoyl peroxide (or cumene hydroperoxide), and 0.3-0.5% cobalt naphthenate (calculated as metallic Co) of the polyesteracrylate weight. The choice of solvent has no effect on the film-formation process, but markedly influences the lacquer life. In a film thickness of 50-60u, the polyesteracrylate coatings were hard and glossy. Glycols-containing tetrafunctional polyesteracrylates form highly elastic coatings with good adhesive power but unstable to water; those with 8 and 12 functionality yield low-elastic, poor-adhesion coating which are water-stable. The products are miscible with each other and with many plasticizers; non-miscible with oils. Physico- and thermo-mechanical properties of the coatings were studied and are tabulated. The redox system initiator-accelerator activates polymerization on air of a number of polyesteracrylates.

Fractionation of Raw Tall Oil.

M. L. Van'yan. Lakokrasochnye Materialy i Ikh Primenenie, 1960, No. 6, 31-34.

A fractionating method for tall oil is described, using saturated solutions of urea in methyl and methyl alcohols, and in water. The conditions of optimum yield and satisfactory fatty-acid purity were determined. The paper also indicates the effect of urea, temperature, and time of crystallization on the yield and iodine number of fatty acids in aq. urea solution.

Mathematical Determination of Conditions of Lacquer Drying by Infrared Radiation.

L. L. Pavlovskii. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 3, 43-5.

The optimum and minimum length of drying by infrared is derived for various conditions, with examples and applications given.

Study of the Compatibility of Film-Forming Bases.

E. S. Gurevich and A. M. Frost. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 3, 11-13.

The authors propose a method of evaluating the compatibility of film-forming bases; the method utilizes the temperature of mixing of their solutions. It is shown that the compatibility of solutions of film-forming substances is characterized by a temperature drop, registered as curves of calorimetric experiments and independent of the sign of the heat effect. A simple calorimeter-like instrument is described.

Initiator Reduction-Oxidation Systems used in Polyester Lacquers. (Literature Review.)

N. G. Shtan'ko. Lakokrasochnye Materialy i Ikh Primenenie, 1961, No. 3, 14-19.

From the review of literature (40 references), the author draws some conclusions. Of the two systems which have found widest application in the film-forming polyester substances, only hydroperoxides—Co-salts are suitable for colorless lacquers; cyclohexanone and methylethylketone hydroperoxides are recommended. Mixtures of peroxides, used as initiators, often are more effective than individual peroxides. The activity of redox systems of hydroperoxides and Co naphtenate may be increased by addition of some reducing or complex-forming agents. The importance of determining the optimum solubilities of initiator and accelerator is stressed.

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THIXOTROPIC VEHICLES

(*From page 37*)

Conclusion

The best method for building true thixotropy into a paint is to treat the vehicle. The easiest method of treating the vehicle is to disperse the polyamide Omamid into the vehicle at a low temperature. By varying the level of the polyamide used in the vehicle, the thixotropic body developed in the final paint system can be controlled for maximum efficiency. Sag resistance can be increased as well as pigment settling reduced. One point not mentioned previously in this paper is the potentiality of increased film thickness without the film sagging. This is an important item with respect to traffic paints and other specialty paint problems. "Omamid" can aid in their solution. There are other paint problems which can also be solved by using "Omamid" to gel the vehicle. "Omamid" seems to provide excellent support for heavy pigments where thixotropy does not enter into the picture. For example, an ever expanding sales item for "Omamid" is in a paint containing 15-20 lbs. of zinc per gallon which is now being used as a metal primer.

LITERATURE CITED

(1) Peterfi, T., Arch. Entwicklungsmech. Organ. 112, 660, (1957).

(2) Alexander, Jerome "Colloid Chemistry-Theoretical and Applied" Vol. VI, Chapter on Thixotropy pp. 328-347 incl., published by Reinhold Publishing Co., New York (1946).

(3) Green, Henry and Weltmann, Ruth N., "Analysis of the Thixotropy of Pigment-Vehicle Suspensions—Basic Principles of the Hysteresis Loop": I. E. C. Anal. Ed. 15, 201-206 (1943).

(4) North, A. G. "Thixotropic Alkyds": J. Oil Colour Chem. Assn. 39, 695-717 (1956) and 39, 863-4, (1956).

(5) Winkler, W., U. S. P. 2,663,649 (Dec. 22, 1953).

(6) Green, Henry and Weltmann, Ruth N. "Equation of Thixotropic Breakdown for the Rotational Viscometer", I. E. C. Anal. Ed. 18, 167-72 (1946).

(7) Bloomquist, C. Ross, "High Speed Rotational Viscometer", Interchemical Review 7; No. 1, 16-22, (Spring 1948).

(8) Pryce-Jones, J. "Experiments on Thixotropic and other Anomalous Fluids with a New Rotational Viscometer", J. Sci. Instruments 18, 39-48 (1941).

(9) Gamble, D. L. "Thixotropy in Paints", I. E. C. 28, 1204-1210, (1936)

BLISTERING OF STEEL

(*From page 44*)

optimum of conditions under which the Corrosion Dia Phenomenon develops. Some water is necessary for the transport of oxygen as well as for the (electrochemical) corrosion process which can only take place in a wet continuous phase. But if too much water and oxygen are supplied, the diffusing hydrogen available by corrosion of the bare parts is not sufficient to create an oxygen-poor environment under the film at the Dia side.

However, when electrolysis supplies a considerable larger amount of hydrogen through the metal (Table 2), the Corrosion Dia Phenomenon shows strongly even in cases where the lacquer takes up an appreciable amount of water.

We trust that this investigation may contribute to the understanding of the process which takes place in the system paint—metal. This system has a *structure* and its reactions can be understood only by a study of the consequence of their intimate relationship, and not by just adding the qualities of both. Thus the optimum qualities can be reached only by a choice of the right compromise. We see for instance that less corrosion may result from more water permeability.

As to practical importance, in any case, it may be clear that care should be practised when building up paint systems and judging the results by scratching on one side of sample. Besides, any rust developing on a painted steel piece may give rise to the changes indicated somewhere on the same side or at the back. Recently, the Dia Phenomenon has been observed in roof tests, made on 4 mm thick steel. One panel should not bear more than one system.

It was our aim to describe the Dia phenomenon. Although the explanations may not be completely satisfactory, we hope to have thrown some more light upon the complicated and diversified processes with which the deterioration of painted steel is associated.

Acknowledgment

The author wishes to thank the N. V. Philips' Gloeilampenfabrieken (Eindhoven, Netherlands) for the permission to make this publication; Dr. F. R. Schepman for the opportunity given to carry out these investigations; many of his colleagues for valuable and stimulating discussions and Mr. N. Dedding for his efforts in carrying out the experiments.

Literature

1. J. A. W. van Laar. Die Unterrostung von lackiertem Stahl. Entstehung, Bestimmung, Bekampfung. (The underrusting of painted steel. Origin, Determination, Avoidance). Deutsche Farben Zeitschrift.

2. G. A. Nelson and R. T. Effinger. Blistering and Embrittlement of Pressure Vessel Steels by Hydrogen. Welding Research Supplement (Jan. 1955, p. 12-S).

3. J. Class. Spannungskorrosionsartige Erscheinungen an mechanisch beanspruchtem Stahl durch diffundierenden Wasserstoff (Stress corrosion Phenomena of mechanically tried Steel by diffusing Hydrogen). Werkstoffe und Korrosion 10 (1955) 237.

4. H. Fischer und H. Heiling. Wasserstoffuberspannung und Wasserstoffdiffusion durch Eisenkathoden (Over-tension of Hydrogen and Diffusion of Hydrogen through Iron Cathodes). Z. Elektrochem. 54 (1950) 183.

5. U. R. Evans. An Introduction to Metallic Corrosion. Ed. Arnold (London 1948)

6. A. Nicholson and H. A. H. Jenkins. The Blistering of Paint Films on Steel Surfaces. Trans. Inst. Met. Finishing. Torquay Conference (1955) 32 (1955) 385.

7. P. J. Gay. Blistering of Paint Films under Sub-Marine Conditions. J.O.C.C.A. 32 (1949) 488.

8. P. J. Gay and J. E. O. Mayne. Blistering of Paint Coatings. Paint Technology 21 (1957) 39.

9. J. K. Wirth and W. Machu. Die Korrosion des Eisens unter Schutzfilmen, ins besondere Farbanstrichen (The Corrosion of Iron under protective Coatings, Paints particularly). Verlag Technik, Berlin 1952.

ALKYD RESINS

(*From page 52*)

actually may be used with some oleoresinous materials as well as with alkyds. Normally, the alcohol modified-resins are supplied in a solution of the alcohol or a mixture of the alcohol and xylene. Both non-drying and drying alkyds may be combined with the resins although, as might be expected, better color and color retention is obtained from the non-drying type alkyds and thus they are the preferred compositions. As indicated above, acid catalysts such as phosphoric acid may be utilized with the urea resin-alkyd combinations to achieve faster cure.

There is little question but that alkyd combinations with urea and melamine resins will continue to prosper for many years to come. The recent advances described in automobile coatings are indeed encouraging and are typical of what may be expected from continued research. The utility of these coatings for appliance enamels seems well assured and there is very little on the horizon to threaten these, particularly because of the excellent whites which may be obtained. Even so, there is room for improvement in achieving greater flexibility and better adhesion, and research in these areas is required.

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TITANOX-A-168-MO TITANOX-A-168-LO	Whiteness retentive. (MO- medium oil absorption; LO- low oil absorption.)	White exterior house paints (often along with a proportion of rutile pigment such as TITANOX-RA-50).
TITANOX-AA	Whiteness retentive; semi-chalking.	Some white exterior house paints in which anatase is preferred to rutile; largely replaced by TITANOX-RA.
TITANIUM (RUTILE)-CALCIUM PIGMENT (Approx. 50% TiO_2, 50% $CaSO_4$)		
TITANOX-C-50	High hiding intermediate between rutile "pure" TiO_2 and 30% TiO_2 rutile-calcium pigment.	Semi-gloss and satiny finishes, flat wall paints—especially alkyd flats requiring lowered prime pigment volume, enamel undercoaters, trade sales enamels, general utility paints.
TITANIUM (RUTILE)-CALCIUM PIGMENTS (Approx. 30% TiO_2, 70% $CaSO_4$)		
TITANOX-RCHT	General purpose.	Interior architectural and trade sales paints—flats, semi-gloss and gloss paints, painters' enamels, wall primers, enamel undercoaters; usually along with TITANOX-A in exterior house paints; traffic paints.
TITANOX-RCHT-X	General purpose, maximum ease of dispersion.	Similar to TITANOX-RCHT.
TITANOX-RC	"Non-chalking"; exterior tinted paint grade.	Exterior tinted coatings which require extended titanium dioxide pigment, such as house paint tint bases, floor, porch and deck enamels, trim paints, etc.; exterior house paint primers.

In addition, TITANOX-A-WD anatase TiO_2 has been used in early types of water paints of the calsomine type. Other TITANOX white pigments, not designed primarily for use in paints, may be of interest to the paint researcher, such as TITANOX-RA-40 a rutile titanium dioxide that yields the color of anatase plus high opacity in certain compositions and TITANOX-A-CG an anatase titanium dioxide remarkably free from coarse agglomerates in some aqueous systems. To help solve special problems in which titanium pigments are the governing factor, we are willing to offer highly specialized products.

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There are three types of petroleum thinners available to the coatings industry:

1. Aliphatic types are obtained from direct distillations of crude oil. To obtain naphthas with a specific boiling range, a closer fractionation is made on the broad naphtha cut from the crude. The fractions are then chemically treated to improve color and odor and to remove ingredients that may cause corrosion or have a tendency to form gummy deposits and residues.

2. Pure aromatic hydrocarbons and alkylated aromatics are another broad class of petroleum thinners. Benzol, toluol, xylol, and petroleum naphthas of high solvency belongs in this group.

3. Iso-paraffinic thinners, or odorless types are branched chain paraffinic hydrocarbons. This type of thinner is not obtained directly from the crude oil, but is synthetically produced by alkylation. The alkylated products are low in odor and have relatively poor solvent power.

Generally speaking, hydrocarbons are not active solvents for most resinous substances but act as diluents in resinous solutions containing active solvents. Since most resin solutions will tolerate more aromatic than aliphatic or naphthenic hydrocarbons it follows that aromatics have the greater solvent power. The high-solvency naphthas are made by (1) cracking and cyclizing, followed by close fractionation, or (2) solvent extractions of aromatics from certain crudes.

The petroleum solvents commercially available are mixtures containing a number of different hydrocarbons, the relative composition varying within reasonable limits. Thus, their physical and chemical characteristics vary, even within the same boiling range. As a result great care and control of manufacturing procedures is important so that the product will be of sufficient uniformity in composition that its user can depend on its suitability for his specific use. Such properties as solvent power, rate of evaporation and odor are used to judge the quality of petroleum thinners.

Evaporation Rate

One of the important functions of solvents is thinning the coating to proper viscosity for application (brush, spray, roller coating, etc.). They also influence the drying properties of the paint film. Poor brushing properties and lack of wet edge can be traced to a solvent that evaporates too rapidly from the film. Similarly, long drying time, sagging, running and thin coats may be due to solvents having low volatility. Thus, evaporation rate or volatility is of great importance in paint formulation. With the proper choice and amount of thinner, it is possible to govern the viscosity, the proper application and drying characteristics of the paint or coating. Evaporation rate data is a big help to the formulator as such information enables him to select a thinner which best suits his needs. Blending of two or more solvents is common to obtain certain desired properties for a specific application.

The Shell Thin Film Evaporometer has long been recognized as a useful instrument for determining the relative evaporation rates of solvents from a thin film of the neat solvent itself or from coatings. The relative times to evaporate various fractions of the test solvent are obtained in addition to the total evaporation time. Since wet film drying properties depend to a great extent on the rate of evapora-

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tion of a portion of the solvent rather than all of it, the usefulness of an instrument which measures the incremental volatility characteristics of a solvent is readily apparent.

While the Shell Thin Film Evaporometer is relatively easy to use, the determination of evaporation rates of many of the slower evaporating solvents used in paints becomes time consuming and the cost of the instrument is quite expensive for the ordinary paint laboratory. With this in mind, Shell Oil Company has derived a set of equations from which evaporation rates of petroleum hydrocarbon solvents can be calculated. The calculated results compare favorably with actual determinations made with neat solvents using the Evaporometer. To make this calculation easier, Shell provides a circular slide rule, called the Shell Evapo-Rater.

Solvent Power

Solvent power is defined as a measure of the ability of a solvent to dissolve a given product. For most gums and resins the aromatic solvents exhibit greater cutting power than either the naphthenes or the paraffins. The naphthenes, on the other hand, are superior to the paraffins. The solvent power properties of a particular petroleum solvent depends on the type and amount of each hydrocarbon class that is present in it.

A highly aromatic thinner will reduce the viscosity of a given resin solution to a greater extent than the quantity of a less aromatic hydrocarbon.

In fact, certain resins are not compatible with the low solvency thinners and precipitation of the resin solutions occurs when such thinners are employed. It is therefore essential that the paint formulator has information available on the relative solvent power of the particular thinner he plans to use.

Among the imporatnt tests for determining solvent power are the Kauri Butanol Number, Aniline Point and Dilution Ratio.

Kauri Butanol Number

The Kauri Butanol Number value is the point at which a solvent added as a thinner will cloud a solution of kauri resin dissolved in butyl alcohol. By means of the kauri-butanol test, the relative solvent power of solvent can be measured. Thus, the higher the kauri-butanol value, the higher the solvent power, since more of a good solvent can be tolerated than a poor one.

Aniline (and mixed) Point

The aniline point and mixed aniline point tests are simple procedures, easy-to-check, and are for the most part reliable indications of relative solvent power. Since aniline is a poor solvent for aliphatic hydrocarbons but an excellent one for aromatics, it provides a useful means of determining the solvent power of hydrocarbon solvents. The aniline point test is usually selected when measuring the solvency of aliphatic solvents or those with low-solvency and low aromatic content. The mixed aniline test, on the other hand, is preferred in determining the solvency in aromatic solvents where the solvency is high.

As far as petroleum solvents are concerned, the aniline point values are more meaningful than the KB numbers, because the former figure is an indication of the composition of the solvent rather than a measure of its performance characteristics to a specific resin. The aniline point figure can also be of value to the paint formulator for the same reason. It is known that the aromatic hydrocarbons are generally better solvents for resins than the paraffinic types. The thinners of high solvent power will give greater viscosity reduction for the same solids content. Thus, with the aid

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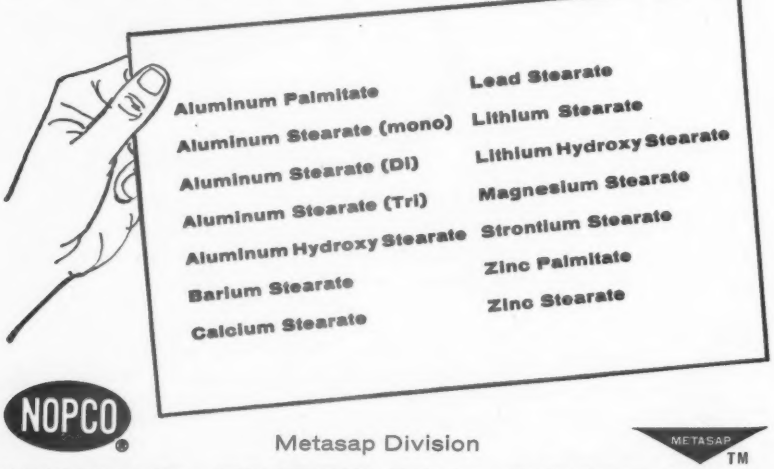

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of aniline point data, the paint formulator knows the type of thinner required for his system. He also can use data obtained from this test as a means of assuring himself of obtaining a thinner to give the desired characteristics to the final blend.

Dilution Ratio

In lacquer formulation, the hydrocarbon solvent is used as a diluent and its diluting power refers to the proportion of diluent that can be added successfully. This proportion will vary with different naphthas. The greater the solvency of a diluent the more of it is tolerated by the nitrocellulose vehicle or solvent mixture. The dilution ratio is a test in which the diluting power of petroleum hydrocarbons for nitrocellulose is determined.

Flash Point

The flash point of a petroleum solvent is the lowest temperature at which the vapors liberated above the liquid will ignite. The flash point is a determining factor in shipping regulations where shipping containers and warning labels are specified according to the flammability characteristics of a solvent.

The test most commonly used in the Tagliabue (Tag) Closed Cup Tester (ASTMD 56-52).

Gravity

The density of petroleum solvents may be expressed as either specific gravity or °API (American Petroleum Institute) at 60°F/60°F (15.6° C/15.6°C) or 68 F/ 68°F (20° C/20 C°). The specific gravity is the ratio of the weight of a given volume of a solvent to the weight of an equal volume of water. Since this varies with the temperature, petroleum solvents are tested for gravity at 60°F and other temperature readings should be corrected to this temperature.

The API gravity is an arbitrary unit expressed in degrees, and related to the specific gravity in the following manner.

$$\text{API Gravity (degrees)} = \frac{141.5}{\text{Sp. Gr. at } 60°\text{F}} - 131.5$$

The higher the specific gravity the lower will be the API gravity and conversely.

Odor

It is desirable, that ordinary petroleum solvent such as mineral spirits and VM&P naphtha have a low level of odor as possible. To insure the user that he is getting a product of uniform odor quality, the refiners treat the raw distillates which involves chemically removing the odor-producing ingredients such as sulfurous compounds. Adsorption methods are also employed to remove odor bodies. In addition to producing a product having a low odor level, these treatments aid in stabilizing the product against deterioration during storage plus help to maintain the color of thinners which are essentially water white.

•

Oil-Base Paint Found Cause of High Hydrocarbon Level

Oil-base paints are chiefly responsible for high concentrations of hydrocarbons in submarine atmospheres, according to the first in a series of annual Navy habitability research status reports available through the Office of Technical Services, Business and Defense Services Administration, U.S. Dept. of Commerce, Washington 25, D.C.

The conclusion that oil-based paints are the culprits is based on new sampling and analytical techniques. The problem is discussed in a section evaluating three types of water-thinned paints generally used aboard ship.

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- Assure Color Stability
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Low particle size assures quality paints at high pigment concentrations thus reducing costs. Formulation is easy with standard equipment. Used for primer-sealers, interior and exterior paints — especially recommended for brick, stucco, cinder block, and masonry.

Solids	55 ± 1%
pH	4 — 5
Average Particle size	.2 Micron
Freeze—thaw resistance	Excellent
Mechanical Resistance	Excellent
Borax Stability	Excellent
Water Resistance	Better than average PVA
Weight per gallon	8.9 — 9.1 lbs.

FARNOW

Varnishes

Emulsions - Alkyds

STillwell 6-1144

FARNOW, INC.
4-83 48th Avenue
Long Island City 1, N. Y.

IF IT'S EFFICIENCY YOU WANT...

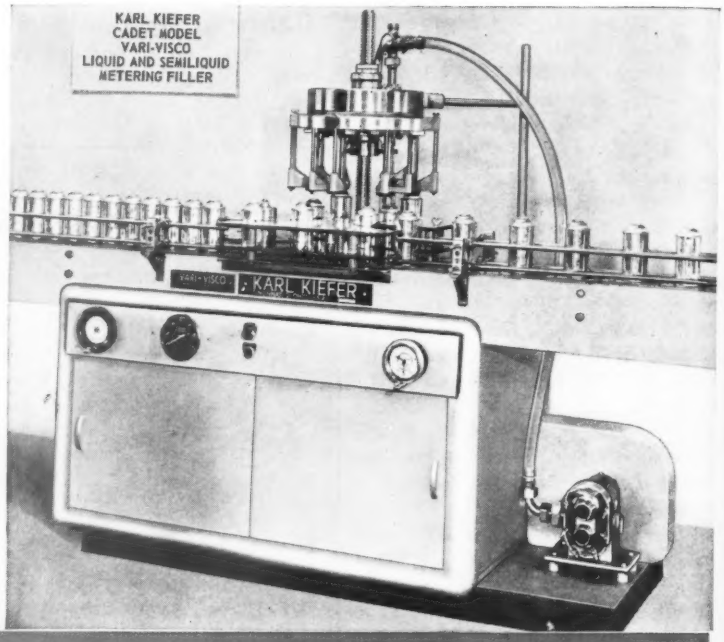
THEN IT'S KIEFER!

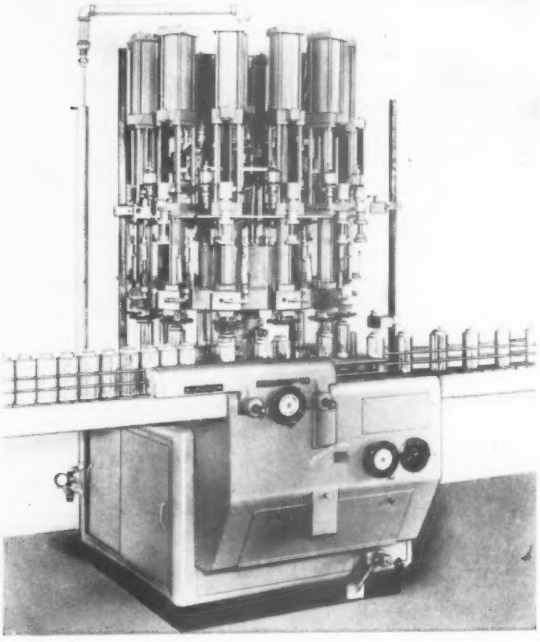
Select the KARL KIEFER CADET VARI-VISCO for the Product Measuring Filler and KIEFER Gas Jet for the Charging Unit.

You will have decided wisely.

Both will do exactly what is expected of them.

Each built in a range of sizes.





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12-STEM AEROSOL CHARGER

Delivers up to 250 CPM depending on your valve selection. It will meter the propellent gas deftly and to perfection.

KIEFER quality and performance, through the years will prove to be a valuable investment.

The Karl Kiefer Machine Co.

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AEROSOL COATINGS

PACKAGING

FORMULATION

PRODUCTION

Semi-aerosol filling equipment to meet the needs of those aerosol paint manufacturers whose production runs are less than 1 million units per year is analyzed in this month's feature. See page 105.

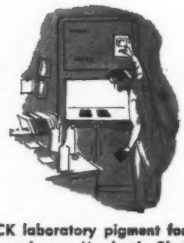
MACBETH EQUIPMENT HELPS SPRAYON CONTROL COLOR!

If you have problems controlling color the Sprayon advertisement reprinted below will tell you, more eloquently than we can, how easily you can blend the knowledge and experience of your people and the right combination of **Macbeth ®Skylight and ®Examolite Fixtures** for complete color control. After you have finished reading the reprint we are sure that you will want to talk to the Macbeth representative in your area. He is equipped to recommend just the right combination of this equipment to fill your exact needs at lowest cost. For complete literature, prices and to arrange for the visit of a Macbeth engineer salesman, please address correspondence to Macbeth Daylighting Corporation at the address shown below.

Self-spray paint troubles stop here

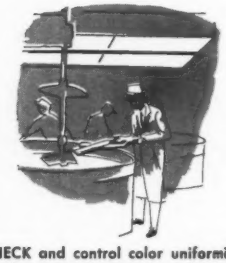
This is part of Sprayon's quality-control laboratory, where six full-time chemists and paint technicians make sure that your aerosol finishes—custom-loaded by Sprayon—never vary in color or performance. Before production begins, even on a routine re-order, prototype cans are made up in the laboratory and given an accelerated aging test equal to a year of shelf life. Test panels are then sprayed and the film is analyzed by precision instruments. Gloss and other characteristics are checked. Color is double-checked under a MacBeth light, the accepted standard of the paint industry. The spray pattern and the mechanical efficiency of the container are checked. All test data, materials and samples are dated, coded and filed for a year for later reference. Sprayon quality control is one reason why Sprayon has handled the greatest possible variety of contract-loading assignments for many of the nation's largest manufacturers—year after year after year. Get the full Sprayon story today.

SPRAYON PRODUCTS, INC. 2087 E. 65th St., Cleveland 3, Ohio



CHECK laboratory pigment formulation under a Macbeth Skylight. Macbeth Skylights offer the extra protection of the two variant lamp system:

1. **The finest duplication of north sky daylight at 7400° K.**
2. **Horizon sunlight. Available at the flip of a switch allows you to double check color shift, avoid sour colors, metameric matches.**



CHECK and control color uniformity of the production batch under low cost Examolite Fixtures to make sure color quality remains up to customer and laboratory standards.

CHECK samples of production periodically against laboratory O.K.ed samples.

Macbeth

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LARGE SCALE PRODUCTION OF AEROSOL PAINTS

PART II

By
John J. Sciarra*

PART I of this article described in detail the component parts necessary to carry out the successful filling of aerosol paints by either a cold or pressure filling method. The nature of this equipment requires a considerable amount of space and will produce on the average of about 120 cans per minute. It is generally recommended where the production of aerosol products exceeds one million units per year. It is at this figure that automatic equipment would reduce the labor costs by producing the desired volume in a shorter period of time.

Completely automatic aerosol equipment is generally used by custom fillers as well as paint manufacturers producing aerosol paint products in large quantities.

Semi-Automatic Fillers

However, for those contemplating aerosol paint products in smaller quantities and do not wish to avail themselves of the services of the custom filler may wish to consider semi-automatic aerosol filling equipment, having various filling speeds. Most of these units are complete in all respects and contain all the necessary components. It is a simple matter to connect to services such as propellant supply, air or vacuum source, and electrical supply if necessary.

A typical semi-automatic unit is available from the Kartridge Pak Co., and is shown in Figure 1. This unit can produce up to 10 cans per minute or 350 cases per work day and is a complete aerosol filling line. A positive displacement piston filler for the concentrate (0 to 16 oz. capacity), an air-operated crimper for fastening all standard one-inch can valves, and a propellant pressure filler (0 to 300 gram capacity) make up the essential parts of this unit. A propellant accumulator and air operated propellant pump complete the equipment. The entire unit occupies a space of 32″ x 72″ x 74″ high or 250 square feet of floor space. However, auxiliary equipment such as a test water bath and packing table are required. A typical arrangement is shown in Figure 2.

A similar semi-automatic aerosol filling line capable of producing about 7 cans per minute is available from Pressure Pak, Inc. This unit, measuring 4′ long x 2′ deep x 2′ high consists of a product filler, can crimper, gasser, and pressure tester is shown in Figure 3. This equipment is self-contained and does not require an external source of electricity, air, etc. It is completely manual in operation. The filling unit is basically a stainless steel

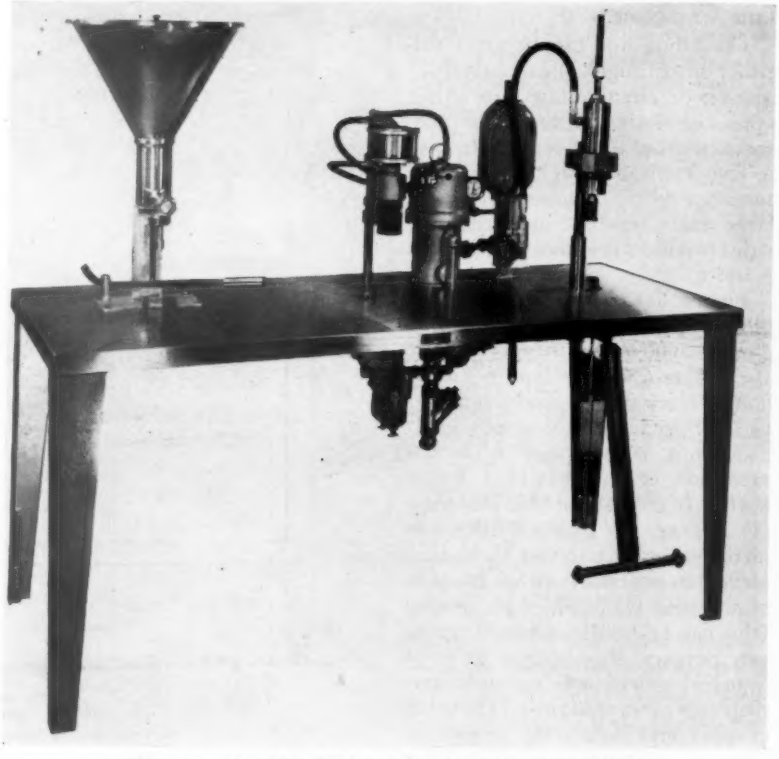


Figure 1. Kartridg Pak's semi-automatic aerosol line.

*Associate Professor of Pharmaceutical Chemistry, St. John's University, College of Pharmacy, Jamaica 32, New York.

hooper fitted with a shut off mechanism. A manually operated crimper will seal the valve in place while the gassing unit, a 25 pound cylinder of liquefied gas inverted over the filling mechanism, is used to add the propellant. A water test bath must be added so that each container may be adequately tested. In addition packing tables are required.

A self-contained unit capable of filling between 3-35 containers per minute is available from John R. Nalbach Engineering Company. This is a hand operated aerosol line and is used for those products requiring shaking during the gassing cycle. This has been designed for use in the food field, but may be applicable to aerosol paints if and when compressed gases such as carbon dioxide or nitrogen are used as the propellant. Figure 4 shows such a unit and consists of a "Filamatic" filler with a capacity of from 13 to 260 cc, a crimper which is air operated, a coder, a gasser which is also air operated, and a packing table. A water test bath is also required with this unit.

Other similar units are available from other manufacturers, and their names and addresses are given at the end of this article.

Line Arrangement

The filling line can be arranged either as a straight line or a double, square, or circular line depending upon the design of the plant and space allotted for this purpose.

Two typical straight line pressure or cold filling lines capable of large scale production of aerosol paint products are shown in Figures 5 and 6.

Figure 5 shows a straight line filling operation capable of producing 3600 containers per hour. By adding a similar line to give a double track design productions up to 7200 per hour may be obtained. This unit is complete with the exception of tables and a water bath. It consists of the following (1) cleaner, (2) product filler, (3) nitrogen purging tunnel to replace air left in container with a blanket of nitrogen, (4) liquefied gas purger (this can be used in place of nitrogen purger; this adds a drop of liquefied gas which expands and displaces air in container,) (5) valve crimper and coder, (6) propellant filler (7) nitrogen gasser used in

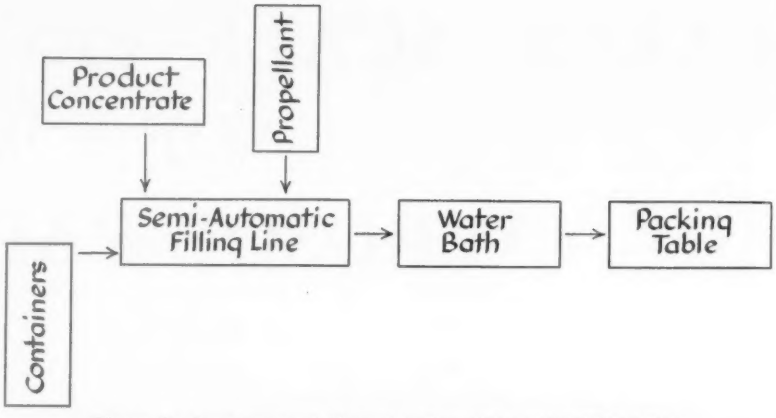


Figure 2. Arrangement of semi-automatic aerosol filling line.

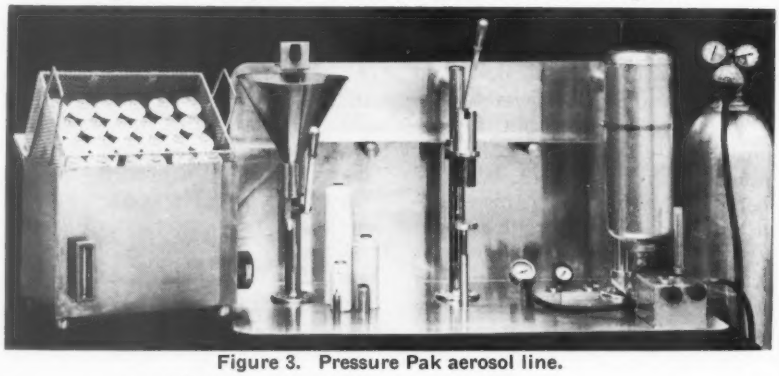


Figure 3. Pressure Pak aerosol line.

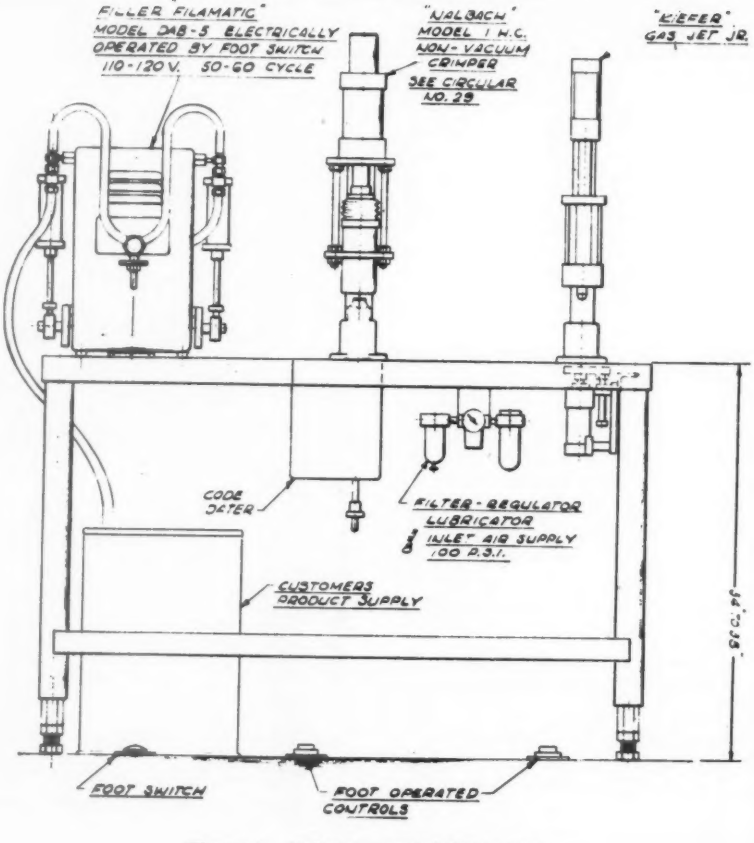

FILLER "FILAMATIC" MODEL DAB-5 ELECTRICALLY OPERATED BY FOOT SWITCH 110-120 V. 50-60 CYCLE
"NALBACH" MODEL 1 H.C. NON-VACUUM CRIMPER SEE CIRCULAR NO. 29
"KIEFER" GAS JET JR.
CODE DATER
FILTER-REGULATOR LUBRICATOR
INLET AIR SUPPLY 100 P.S.I.
CUSTOMERS PRODUCT SUPPLY
FOOT SWITCH
FOOT OPERATED CONTROLS

Figure 4. Nalbach aerosol filling line.

place of propellant filler, (8) pressure tester for inert gases. Pressure tester for inert gases will reject any can not having proper pressure and (9) drive unit to pull the can conveyors. To this is then attached a water bath capable of attaining at temperature of 130°F. Other accessory equipment described in Part I (September) can then be added.

A similar filling line making use of rotary filling equipment is shown in Figure 6 and is capable of productions of 7000 per hour and up depending upon the number of units used. The basic line consists of (1) 16 head cleaner, (2) 16 head "Electromatic" type filler completely automatic, (3) Accu Ray unit for X-Ray check on level of fill. This is relayed back to filler so adjustments are automatically made. (4) valve feeding area, (5) valve crimper and coder, 12 head, (6) propellant filler, 16 head. A product accumulator, water bath, and other accessory equipment can then be added.

These lines can be modified so that they will suit individual needs. They are built in sections and different sections can be added or deleted depending upon production schedules and type of operation. For example, higher production figures may be obtained by using more than one product filler, valve crimper, and propellant filler. Instead of using 12 head fillers, 16 head or larger fillers can be used. These will substantially increase the production.

Cost of an Aerosol Line

It is difficult to predict what a complete aerosol filling line would cost. This would depend upon many factors including especially the type of equipment desired and the production anticipated. However, an attempt will be made to give an approximate indication of the cost of some of the units needed to carry out this operation.

Unscrambler	— $900 - $1100
Air Cleaner	— $8000- $10,000
Concentrate Filler	— $12,500
Valve Crimper	— $15,000
Pressure Filler	— $17,000
Water Bath	— $8,000
Labler	— $3,500
Coder	— $1000- $1700

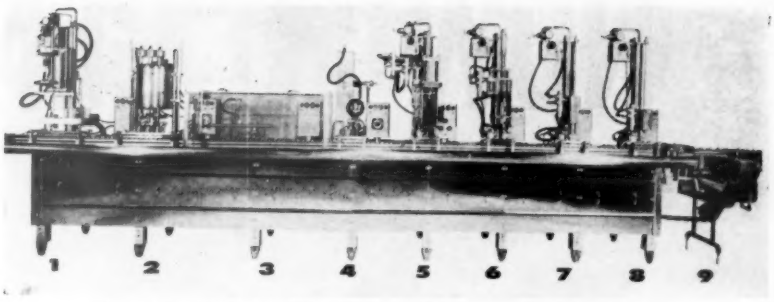


Figure 5. Straight line aerosol (cold or pressure) filling line.

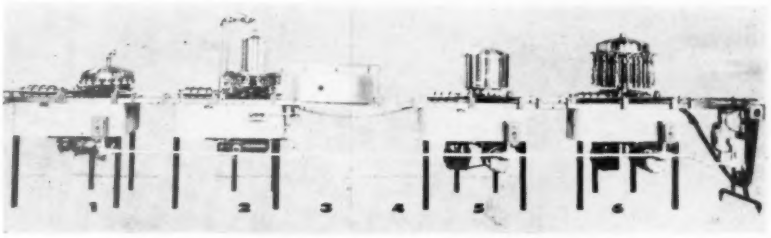


Figure 6. Rotary aerosol (cold or pressure) filling line

These figures indicate an approximate cost in the area of $68,000—$70,000 for a fairly automatic aerosol filling line. A similar line operating by the cold filling process would be slightly more expensive.

Cost of some of the other equipment would involve the following if necessary:

Blow-off and Dry Unit (to remove moisture	—$2,800
Pressure Tester (if necessary)	—$11,500
Over Cap Placer	—$14,000
Packing Table	—$1,850

Some of the smaller, self contained units would involve the following costs:

Semi-Automatic Aerosol Line (Kartridge Pak) (exclusive of tables and water bath)	—$4,000
Manual Operated Aerosol Line (Pressure Pak) (inclusive of water bath and tables)	—$ 400
Cost of water bath for above	—$ 245
Semi-Automatic Aerosol Filling Line (John R. Nalbach Engineering Company (exclusive of water bath)	—$4,000

It should be pointed out these costs are approximate and are given only as an indication of the expenses involved. In order to obtain a more representative cost, it is best to meet directly with the equipment manufacturer and determine the type of equipment needed for any particular operation.

Using the semi-automatic equipment (about $4,000) the following approximate product cost is given for a 16 ounce paint product assuming a formulation of 50% paint and 50% propellant.

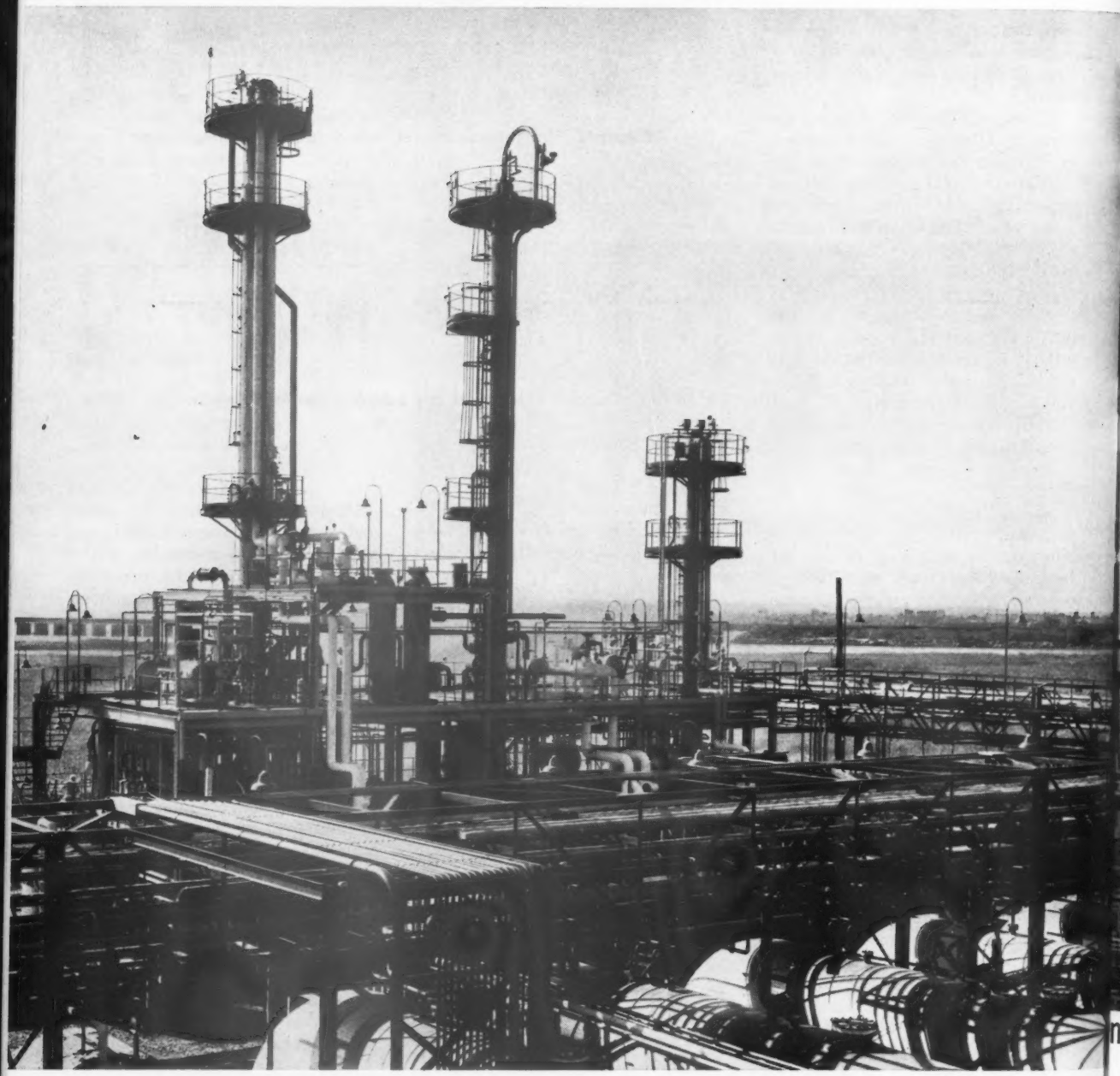
Container cost	— 5.6c
Valve and actuator	— 3.5c
Propellant	—12.0c
Over cap	— 0.5c
Label	— 1.5c
Labor	— 1.6c
Total Cost	24.7c

This cost is exclusive of 8 ounces of paint product.

Suggested Manufacturers of Aerosol Filling Equipment

1. The Kartridge Pak Company, 800 West Central Road, Mount Propsect, Illinois.
2. Pressure Pak, Incorporated, West Palm Beach, Florida.
3. John R. Nalbach Engineering Company, 6139 W. Ogden Avenue, Chicago 50, Illinois.
4. The Karl Kiefer Machine Company, Cincinnati 2, Ohio.
5. The J. & G. Machine Works, West New York, New Jersey.
6. Lemay Machine Company, 276 Lemay Ferry Road, St. Louis 23, Missouri.

NOW 3 "GENETRON"®



Above: General Chemical's brand-new "Genetron" plant in Elizabeth, New Jersey has a capacity of more than 10,000 tons of "Genetron" per year. Its output will serve consumers throughout the Northeast. This large new plant is the third "Genetron" facility serving industry. It supplements production at Danville, Illinois, and Baton Rouge, Louisiana. These three highly efficient, big-capacity plants are three good reasons why General Chemical is your *dependable* source for highest quality fluorocarbon refrigerants and aerosol propellants. Be sure—always specify "Genetron."

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New "Genetron" plant at Elizabeth, N.J. now on stream

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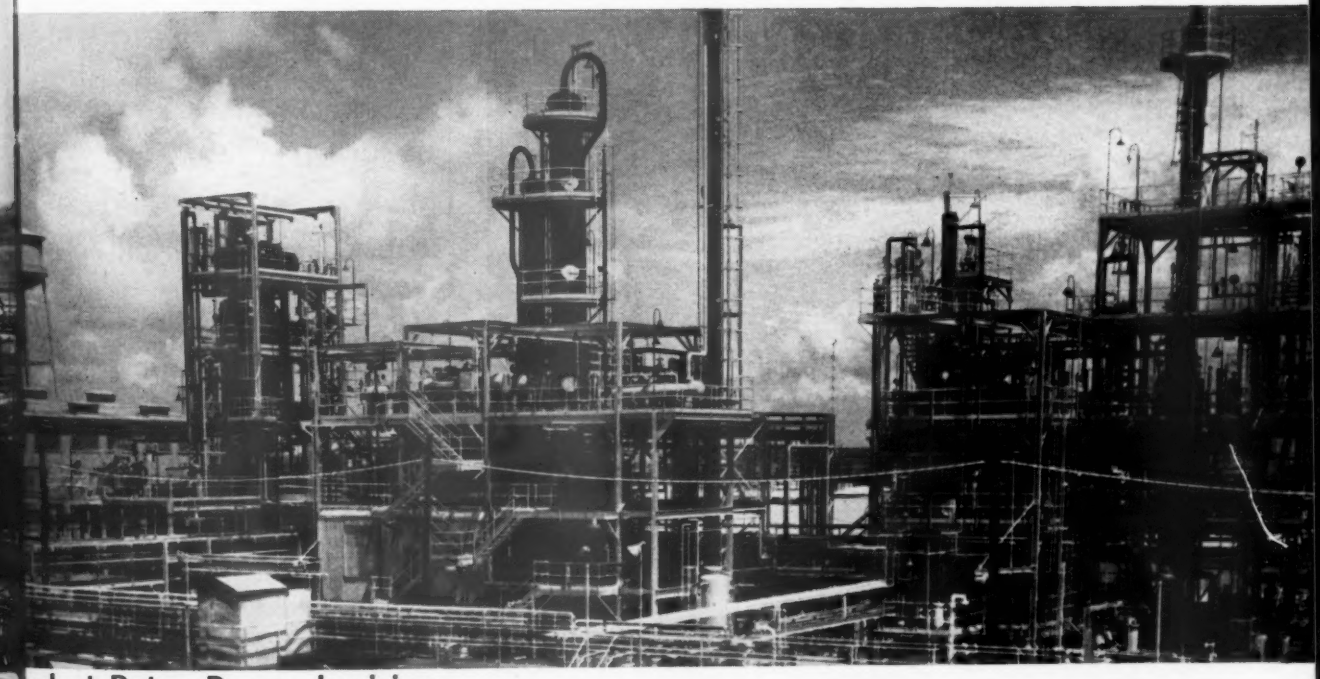


nd at Baton Rouge, Louisiana

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

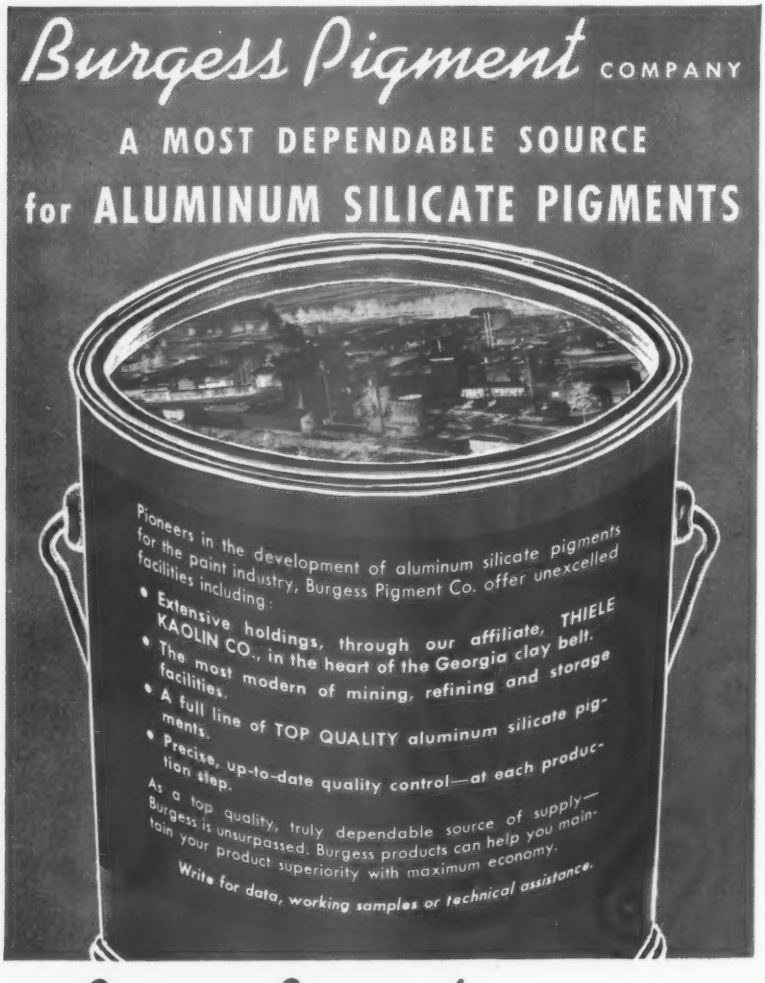
Aerosol Developments

New Aerosol Book

"Pressurized Packaging (Aerosols)", Second Edition, By A. Herzka and J. Pickthall. Publishers: Academic Press Inc., 111 Fifth Avenue, New York 3, New York. $15.00.

An up-dated version of the 1958 edition of this comprehensive reference work, "Pressurized Packaging (Aerosols)" includes new material on compressed gases and formulations employing compressed gases, a new section on legal requirements containing regulations, and a bibliography of relevant patents.

The 21-chapter book deals with propellants, containers, valves, filling methods, laboratory procedures, emulsified systems, and perfumes. A complete section on formulations (more than 200) covers paints and varnishes as well as numerous other products. Trade names, patents and a world directory of suppliers are appended.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Polyurethane Base Satin Varnish

A new, instant spray satin varnish with high resistance to spotting has just been announced by Sapolin Paints, Inc., NYC.

This new aerosol product, Instant Satin Varnish, has a polyurethane base that withstands the most rugged abuse. Instant Satin Varnish practically eliminated the common problem of unsightly tabletop "rings" made by damp glassware, claims Sapolin. Surfaces coated with this new varnish can be wiped with a damp cloth and the rings vanish.

Instant Satin Varnish is available in the standard Sapolin 16 ounce U-Spray-It can. Its companion product comes in a high gloss finish.

Aerosol Paint Plant To Be Built in Medina, Ohio

A ground-breaking ceremony marking the immediate construction of what is reported to be the most modern aerosol paint plant ever built in the world, was recently held in Medina, Ohio by Plasti Kote, Inc.

The new plant will cost in excess of $1 million and will have 100,000 square feet of ultra-modern manufacturing, laboratory and warehouse space. The new plant, the ninth new industry to come to Medina in recent years, will be built on a five-acre tract, with an additional 15 acres available for future expansion. 5,000 square feet will house the administrative and executive offices, in addition to the 100,000 square foot manufacturing space in the new building.

The aerosol paint plant, according to the firm, will be the most modern in Ohio and in the world. Also, the plant will have an eventual production capacity of 50 million cans of spray paint a year.

Unique Rust-Oleum Snorkel Tube

Rust-Oleum Corporation's snorkel tube is designed to reach inside car doors to stop hidden rust without the necessity of removing upholstery.

Heretofore, it was well nigh impossible to reach the hard-to-get-at areas inside car doors and rocker panels without a major dismantling job on the car or truck. Rust-Oleum's practical answer to the damaging headache of hidden rust is a new technique which utilizes a Snorkel Rust-Reaching Tube.

The snorkel is a three and one-half foot flexible plastic tube that is equipped with a Rust-Oleum Spray Container Head at one end. This head attaches to the top of the 16-ounce, self-spray container of Rust-Oleum 769 Rust-Stopping Primer.

The Snorkel Kit includes one 16-ounce self-spray container of Primer, one Case-Hardened Steel Punch, one Spray Head and six extruded lengths of Plastic Tubing, six Cadmium Plated Steel Insert Buttons, and one standard Rust-Oleum Spray Head. The kit includes materials to coat the insides of four car doors and the insides of two rocker panels, with the entire job normally taking less than thirty minutes.

The punch, supplied in the kit, is used to drive a hole in either door or rocker panel, allowing the snorkel to be inserted. After spraying and removal of the snorkel, one of the cadmium-plated buttons from the kit is snapped into the hole to provide a finished appearance.

The complete Snorkel Automotive Rust-Stopping Kit is packaged in a compact seven-and-a-quarter inch by four inch size and is featured at automotive, hardware and paint stores.

Pennsalt Appoints Sales Representative

Herbert Benedict has been appointed a midwestern sales representative for the isotron dept. of Pennsalt Chemicals Co. Assigned to the north central states area including Chicago, northern Ill., Wis., and Minn., he will represent the firm's line of isotron refrigerants and aerosol propellants.

Colton Appoints Field Service Engineer for N. Y.

Arthur Colton Co. has appointed Carl Lessig as Field Service Engineer for the New York area. In his new position, Lessig will operate out of the Colton Eastern Branch office at 566 Grand Ave., Englewood, N. J., under the direction of District Manager Warren I. Smith.

CSMA to Meet in New York December 4-6

The Chemical Specialties Manufacturers Association will hold their annual meeting at the Roosevelt Hotel in New York City, Dec. 4-6th. The Aerosol Division has planned an informative and interesting program for this coming meeting.

FIND OUT what these versatile surface-active agents can do for you

Tenlo®-70. An oil-soluble, nonionic mixing and grinding aid. Offers advantages in production processes and in quality finished products.

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NEWS

Midway Can Named Sales Agents For Milton Can

The George A. Milton Can Co., Inc., of Brooklyn, N. Y., has named the Midway Can Co., St. Paul, Minn., as its sales agents for Minnesota, North and South Dakota, Iowa, and Wisconsin. The Midway Can Co. will handle sales with emphasis on the new two-gallon Tinsteel pails recently developed by Milton.

Foster D. Snell To Initiate Tests for Floor Finishes

Revised specifications covering finishes for floors of Northern Hard Maple have been issued for the Maple Flooring Manufacturer's Ass'n. by Foster D. Snell, Inc., consulting chemists and chemical engineers. As the official laboratory for the MFMA, the Snell organization started testing based on the new specifications, September first.

The new specifications supercede those published in 1958. They establish upgraded standards for finishes for both heavy-duty and gymnasium floors and are designed to give users of these products the benefit of new developments and improvements since the last specifications were issued. All finishes meeting the new specifications will be placed on the MFMA approved list and can be advertised and sold as MFMA approved products.

Engineering Institute on Paints

An Engineering Institute on Paints will be presented by The University of Wisconsin's University Extension Division on November 30 and December 1. The purpose of the Institute is to review recent developments in the paint industry and to present information necessary for the specification and assurance of quality finishes.

The program, which will be one of objective information not promotion, puts the emphasis on exterior finishes. The reasons for paint failure and their relation to other phases of construction will be investigated. More information from John Peterson, Institute Coordinator, University Extension Division, Department of Engineering, The University of Wisconsin, Madison 6, Wisconsin.

Zinc Paint Tells Temperature

After the 1960 shipyard fire that seriously damaged the aircraft carrier Constellation, investigators were able to determine both the location of the hottest flames and the approximate temperatures attained by noting the effect of the fire on construction material and paint in different parts of the ship.

Evaluation of the condition of zinc chromate paint (used by the navy for corrosion control of steel bulkheads, piping and machinery) which gave accurate estimates of the temperatures reached, indicated whether replacement of fire-damaged pipe was necessary.

Eporal Sales Agent

CIBA Products Corporation, Fair Lawn, New Jersey, an epoxy resin producer, has been recently appointed exclusive sales agent for Eporal, a curing agent recommended for applications requiring long shelf life. Chemically, Eporal is known as diaminodi phenyl sulfone (DDS or DADPS); physically it is an almost odorless tan powder.

Chief end uses for the new product are pre-preg laminates, castings, adhesives, and tooling, according to CIBA.

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HINGHAM, Mass.: R. T. Freeman Co.
JACKSONVILLE, Fla.: C. Withington Co., Inc.
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Fine Silica Pigments ■ Kaolin (aluminum silicate) Extenders ■ Carbon Blacks

NEWS

Zinc-Rich Paint Research

A research project to improve the characteristics of zinc-rich paints has been awarded to three manufacturers of zinc dust pigments in England, reports Dr. Schrade F. Radtke, research director of American Zinc Institute's Expanded Research Program. Most of the practical work will be carried out in the research laboratories of the Imperial Smelting Corporation, Ltd. at Avonmouth, with the assistance of Amalgamated Oxides (1939) Ltd. of Dartford, and Durham Chemicals Ltd. of Birtley.

The AZI-ERP commissioned investigation will give its initial attention to development of better paints for priming of automobile underbodies to decrease corrosion.

Research goals include development of zinc-rich paint formulations that will provide better adhesion, flexibility and welding characteristics than presently available.

New Chemical District Offices

The Chemical Department of McKesson & Robbins, Inc. has established three new chemical district offices to supervise branch sales and warehousing activities in the Philadelphia, North New Jersey and New York City industrial areas. These three districts formerly composed the company's Northeast Chemical District.

James M. Hamilton, John P. Hobe and Frederick Wahlers have been appointed managers of these new districts, with headquarters in Philadelphia, Bloomfield and New York City, respectively.

Walter M. Burgess, formerly manager of the Northeast District, has been appointed to the Home Office Chemical Department staff as coordinator of sales and service to multi-plant customers throughout the country.

St. John's University Packaging Seminar

St. John's University (N. Y.) will conduct a seminar on packaging on Wednesday evenings beginning October 25, 1961 and terminating on December 6, 1961 in St. Albert Hall at St. John's Jamaica campus.

Heading the seminar are Dr. John J. Sciarra of the College of Pharmacy, Professor Thomas E. Chambers of the College of Business Administration and James W. Field, Technical and Field Service Director of the Packaging Institute. The sessions will present the most recent innovations in managerial and technological advances in the packaging field.

Those interested in attending the Seminar are asked to contact Walter Mullen, Director of Public Relations, St. John's University, Jamaica 32, N. Y.

Union Carbide Plant Producing

Union Carbide Chemical Company's plant at Brownsville, Texas is now in production. Acetic acid is the first major chemical being produced there, and acetic anhydride and methyl ethyl ketone are scheduled for future production.

The three chemicals will be made in large quantities to fill the demands of the current chemical market, particularly the growing surface coatings, pharmaceutical and textile industries.

Lighter-Colored, Tougher, More Flexible Surface Coatings

with New

Empol® 1018 Dimer Acid

Emery research has developed a new grade of dimer acid, Empol 1018, with unique advantages for surface coatings. With its improved color and color stability, Empol 1018 can be used in applications where previous commercial grades of dimer were unsuitable. Empol 1018 has a maximum 8 Gardner, compared to 11 Gardner for Empol 1022. Color stability of Empol 1018 is typically 8+ Gardner after one hour at 205° C in an open test tube.

Other Advantages of Empol 1018

By substituting long-chain (36-carbon) Empol 1018 for other dibasics such as phthalic, maleic, or adipic acids, flexibility of surface coatings has been measureably improved. Also, the trimer content (17%) gives a greater degree of toughness by cross-linking polymers. In long-oil alkyd and epoxy ester coatings, the use of Empol 1018 will improve through-dry and increase caustic resistance.

Composition of Empol 1018

New Empol 1018 is 83% dimer acid (a C_{36} aliphatic dicarboxylic acid) and 17% trimer (a C_{54} tricarboxylic acid). Monobasic acids are found only in trace quantities.

Unusual Properties of Dimer Acid

Emery's complete line of dimer acids (Empols 1014, new 1018, 1022 and 1024) exhibit unique properties. The combination of high molecular weight (dimer acid: approx. 565; trimer acid: approx. 845) plus their liquid nature make dimer acids intriguing dibasic for new product research.

Uses of New Empol 1018

Empol 1018's light color and low-monobasic content make it an excellent candidate for alkyds, varnishes, polyamide resins, bodied oils and epoxy ester coatings. Essentially a pre-polymerized fatty acid, it also shortens kettle time and improves through-dry.

Complete Literature—Price

Significant product improvements can be made using new Empol 1018 dimer acid. Although color and color stability is considerably better than Empol 1022, the price is only 1c a pound higher. Empol 1018 sells for 26¼c/lb. in tankcars, East of the Mississippi. Request free evaluation samples. Or, write for Bulletin 421 for complete technical information.

Organic Chemicals Division
Emery Industries, Inc.
Dept. X-10, Carew Tower
Cincinnati 2, Ohio

Emery

NEWS

C. C. Day Co., Sales Agents

The C. C. Day Company, an equipment sales organization located at 1152 Plymouth Building, Minneapolis, Minnesota, has been appointed as general sales agents for the Eppenbach Division of the Gifford-Wood Company.

The Eppenbach Division manufactures homogenizing, emulsifying and dispersing equipment for the use of the petro-chemical, cosmetic, pharmaceutical, food and chemical processing industries, and offers a custom engineering service and systems for specialized or unusual installations.

The agency will serve present and prospective users in North and South Dakota, Minnesota and northern Wisconsin.

Dowdy Brothers, Distributors

Appointment of Dowdy Brothers, of Philadelphia, Pa., as distributors of Asbetol and Micro Velva extender pigments has been announced by the Carbola Chemical Co., Inc.

Dowdy Brothers will provide local deliveries and carload quotations for Asbetol and Micro Velva extenders. The firm will also distribute Asbetol Regular, which is used by caulking and adhesive product manufacturers.

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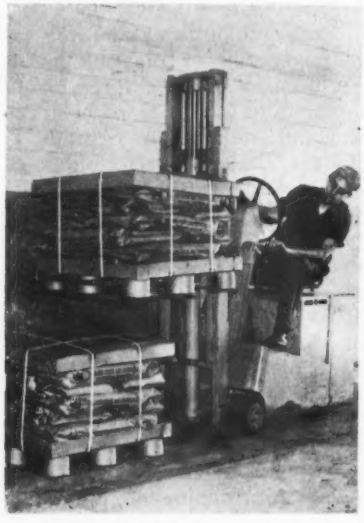


This "unit pallet packaging" method promises easier handling and greater product protection. The first to use this method of shipping organic pigments is Holland Color and Chemical Co. A dozen 25-pound bags are metal-strapped into a protected unit with a pallet underneath, permitting insertion of a lift truck fork. The "feet", nine to a package, are short lengths of corrugated tubing. Easy stacking; pallets and covers disposable; no bags touch floor or ground.

• • •

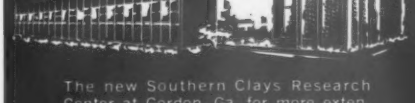
New Packaging Research Lab at Rheem

Rheem Manufacturing Co.'s Container Division has opened a new Research and Technical Service Center in a separate building at Division headquarters in Linden, New Jersey. Research and development operations formerly were located at the Division's Chicago plant.

Many products packed in steel and fibre containers require either some lining or other protective treatment of the container to eliminate corrosion, contamination, discoloration, purity loss, or taste change. Work in the area of protective treatment, exterior finish and lithography, and investigations in the design, fabrication and utilization of new basic raw materials for construction of future shipping containers is planned for the testing labs.

UNPRECEDENTED HIDING AND WHITENESS WITH NEW AL-SIL-ATE NC

A NEW CLAY WITH UNIQUE PROPERTIES FOR PAINTS AT MODERATE COST



The new Southern Clays Research Center at Gordon, Ga. for more extensive product development and more comprehensive technical service for customers.

Here, at long last, is the means to up-grade paints through better whiteness and hiding quality with an ingredient of moderate cost – new AL-SIL-ATE NC.

Always uniform, dependable and readily available, AL-SIL-ATE NC offers many other advantages, including good enamel holdout, sheen uniformity, stain removal, etc.

Send today for full data

SC SOUTHERN CLAYS, INC. 33 RECTOR STREET, NEW YORK 6, N.Y.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

August 28 marked the dedication of the newly-completed Koppers Company Research Center in Somervell Park, Monroeville, Pa. Other buildings are planned for the 176 acre site, which will eventually house 1500 scientists and their assistants. Both basic and new product research will be carried out at the Center.

Paint-Up Campaign

The Metropolitan Clean-Up, Fix-Up Bureau, 2 Park Avenue, New York, is promoting a campaign in the Long Island area, and urges cooperation with business groups, Chambers of Commerce and others who are working for civic improvement.

On Sunday, September 17, the Long Island press had a special tabloid section devoted to this paint-up campaign.

Campaign and display kits are available from Nelson Arnold at the above Bureau address. The Bureau ties its campaign in with paint sales and promotions through paint representatives.

Training Conference Emphasizes Research

Over 50 distributors and sales representatives attended a four-day technical conference recently held by Minerals & Chemicals Philipp Corporation at its Menlo Park, New Jersey offices and research laboratories. An annual affair, the meeting this year was planned as a "refresher course" with specific emphasis on MCP's close sales ties with its research department.

To establish a thorough understanding of MCP products, each session included a description of the raw basic material as mined, how it was processed, its properties and possible applications after processing, and possible future applications.

Union Carbide Appoints New Sales Agent

Quentin Nelson & Co. of Houston, Texas, has been appointed sales agent for Union Carbide Plastics Company, and will service the protective and decorative paint industry in the State of Texas. (Address: 102 Palmer Street, Houston, 3, Texas.) This arrangement provides intensified technical contact with customers and will make available an additional inventory of Bakelite raw materials.

Union Carbide technical representatives from their Dallas office will continue to call on the coatings trade, and warehousing of all Union Carbide products will still be maintained in Dallas.

Mr. Nelson has been engaged in the technical sales of raw materials to the paint industry in the Southwest for more than thirteen years.

Marine Products Show Scheduled for November

The third annual Marine Supplies and Equipment Show, will be held at the Hotel Roosevelt in New York City, November 15, 16 and 17. Exhibit space will be open for the first time to exhibitors showing products not directly in the marine field.

The show is sponsored by the National Associated Marine Suppliers, a non-profit trade association, 736 Woodward Bldg., Washington 5, D. C.

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CALENDAR

Oct. 18-19. Commercial Chemical Development Assoc. Fall Meeting, Palmer House, Chicago, Ill.

Oct. 18-20. 23rd Annual National Packaging Forum of the Packaging Institute, Biltmore Hotel, New York City.

Oct. 30-Nov. 1. Seventy-fourth Annual Meeting of the National Paint, Varnish and Lacquer Assn. Statler-Hilton Hotel, Wash ington, D. C.

Oct. 30-Nov. 1. Fall Meeting of the American Oil Chemists Society, Pick-Congress Hotel, Chicago, Ill.

Oct. 30-Nov. 1. 4th Annual Meeting and Conference of the Canadian Mfrs. Specialties Assoc., Royal York Hotel, Toronto, Canada.

Oct. 31-Nov. 4. 26th Paint Industries' Show. Shoreham Hotel, Washington, D. C.

Nov. 2-4. Annual Convention of the Federation of Societies for Paint Technology. The Shoreham and Sheraton-Park Hotels, Washington, D. C.

November 18-20. Fourteenth Annual Convention and Trade Show of the Retail Paint & Wallpaper Distributors of America at Cobo Hall, Detroit, Mich.

Nov. 27-Dec. 1. Chemical Industries' Exposition, Coliseum, New York City.

December 4-6. Chemical Specialties Mfrs. Assoc., 48th Annual Meeting, Roosevelt Hotel New York City.

PERSONNEL CHANGES

SPENCER KELLOGG

Robert L. Terrill and **Dr. Paul E. Newman** have been named executive vice-presidents. Each will be in charge of one of the two principal product lines of Spencer Kellogg, which was acquired by Textron Inc., on July 28. Mr. Terrill will be in charge of the entire vegetable oilseed operation as well as special chemical products. Dr. Newman will be in charge of Animal Feed Products, including Beacon and Professional Feeds of Spencer Kellogg.

The promotion of three members of the technical staff has also been announced.

Richard A. Bieneman has been promoted to the position of Technical Service Manager.

Marko K. Markoff has been advanced to Manager of the Technical Service Laboratory, succeeding Mr. Bieneman.

Edward J. Baldwin has been promoted to Assistant Manager of the Technical Service Laboratory.

Dr. Paul E. Newman

John D. Harper

BAKER CASTOR OIL

John D. Harper has been appointed field representative in the western sales division. Assigned to Baker's Los Angeles district sales office, Mr. Harper will service the paint, resin, plastics, rubber and chemical industries in the Southern California area.

INLAND STEEL

William E. Geidt has been made manager of marketing of Inland Steel Container Co. He will be located at the container division's general offices in Chicago.

VULCAN STEEL CONTAINER

John C. Rheay will serve as the sales-service representative for the Florida territory, where he will work with users of steel containers.

Constituent Society Meetings

Baltimore, 2nd Friday, Marty's Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Dick Perfidio's Wishing Well.
Dayton — Nov., Feb., April, Hotel Gibbons.
Columbus — Jan., June, Sept., Everglades.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Tuesday, Lucas B & B.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Monday before 3rd Wednesday, Sabella's Restaurant, San Francisco.

Houston, Monday prior to 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Montebello Country Club.

Louisville, 3rd Wednesday, Sheraton Hotel.

Montreal, 1st Wednesday, Qpeen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 2nd Thursday, Philadelphia Rifle Club.

Piedmont, 3rd Wednesday, Rainbow Supper Club, High Point, N. C.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Rugger's.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

CAN TOP SECURING CLIPS

QUICK • SIMPLE
SAFE • REUSABLE

Easily snapped or tapped into place and easily removed with a nail. Will stand rough handling. Meets all Postal Requirements. Patented. Available in 3 sizes to fit any standard cans.

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Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

CHIEF CHEMIST WANTED

Chief Chemist, R. & D., Paints. Medium size Eastern manufacturer making well-established line of chemical-resistant coatings has challenging opportunity for experienced chemist in development and formulation of coatings based on colorinated rubber, vinyls, alkyds, epoxies, acrylics, coal tar pitch, asphalt. Duties also include trouble-shooting requiring broad paint experience. Present chief chemist approaching retirement. Remuneration commensurate with ability. Replies will be kept strictly confidential. Send complete resume preferably accompanied by photo, and indicate salary requirements. Box 1061.

MANUFACTURE UNDER LICENSE

A Swedish paint factory wants to enter into contact with a leading American paint factory in order to establish a technical collaboration and manufacturing under license in Sweden. TRANEMO FARGFABRIK AB, Adr: Tranemo, Sweden.

IOWA PAINT MFG.

Eleven appointments and reassignments of executive personnel in the company and its two operating divisions have been announced. They are: **Nate Ruben** to Assistant to the President; **Walter H. Hecker** to General Manager of Decatur Chemical; **Fred Dixson** to Sales Manager of Decatur Chemical; **Don Nash** to store Merchandising Manager; **Dean Groussman** to store Assistant Merchandising Manager; **Keith Green** to Manager, Goldan Division;. **J. D. Littlewood,** Vice-President, will head the new Bid and Contract division, concerned primarily with government bid business and private label accounts; **Gene Gereke,** Sales Manager, assumes responsibility for the entire field sales organization, covering Iowa and seven surrounding states; **I. R. Beattie,** city sales supervisor in Des Moines, assumes the added responsibility of Assistant Sales Manager; **E. T. Leifson,** Secretary, was promoted to Controller; and **Vernon L. Hintze** was named Assistant Controller.

REICHHOLD CHEMICALS

Harold B. Kirkpatrick has been appointed to the newly created position of Manager, Market Development Melamine Resins, Plastics Division. He will be responsible for coordinating development, manufacturing and technical activities for RCI melamine resins and for providing technical assistance and other service to the melamine sales department.

COLUMBIAN CARBON

Paul J. Melore has recently joined the Sales Department of the Carbon Black and Pigment Division. Mr. Melore will be a Technical Product Manager responsible for the sales development functions of Columbian's dispersion units located at Tacony, Philadelphia, Penn. and Deer Park, Texas.

CABOT CARBON

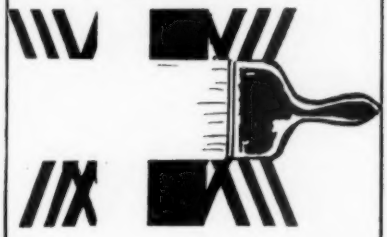
Desmond G. Seymour has assumed the position of Manager, Technical Service, with headquarters at Sarnia Plant. **William H. Ehman** has transferred from the Production Department to the Technical Department as Quality Control Supervisor to assist Mr. Seymour.

William L. Leach, formerly in charge of the Montreal Sales Office, has been transferred to the Toronto Sales Office, as Assistant Sales Manager. **Thomas Crooks** will take charge of the Montreal Sales Office.

Edward L. Somers recently joined the Toronto Sales Department of Cabot.

Alexander Jaychuck has been appointed Process Engineer in the Production Department.

UNIQUE FEATURES
That
The ENGLISH MICA Co.
PRODUCTS HAVE



They provide an increase in hiding power of approximately 12% in many exterior oil and emulsion coatings.

Tests show that only ⅓ as much English Mica need be used to replace other commonly used extenders . . . and this replacement does not appreciably affect viscosity.

325 Mesh Waterground Mica
Micro Mica C-1000
Micro Mica C-3000

These three grades offer three different degrees of flatting, angular sheen, and fineness of grind . . . not obtainable with other micas. The Micro Micas exhibit no sparkle from coarse particles, even on extremely weathered surfaces.

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AGITATOR MOTORS

15 H.P. geared agitator motors; Vertical; Explosion proof. Speed 68 RPM; Designed for 4,000 gal. tanks. New. Davenport, Box 18152, Louisville 18, Ky. Ju 2-2561.

SITUATION WANTED

Paint research chemist. M. Sc., 32. Indian. Desires post. Bhatia, 66 Castlebar Road, London W5, England.

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for a Coating Technologist

Experience Required

United Carbon Company is seeking a man experienced in application of latex coatings in the paper, paint and textile fields. He must have a degree in chemistry and at least five years experience in research, technical service or commercial applications of latex polymers.

Position

Responsibilities will include the introduction of new latex polymers and development of new applications for existing polymer products. In addition, he will provide field technical service to coatings customers. The position will require cooperation with research, development and marketing functions.

Candidates must be willing to travel. Location will be at the new United Carbon Research and Development Center, Houston Texas. Salary will be commensurate with education and experience. Usual company benefits will apply.

Send resume or write to:
Mr. J. H. McKenzie
Vice President, Research & Development
United Carbon Company
P. O. Box 1503
Houston 1, Texas

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New Cymel®* 255-10 reaches a new high in "mirror" gloss

Now, Cyanamid announces a major advance in melamine resin coating technology. New Cymel 255-10 gives you all the advantages of the best melamine coating resins, plus a higher gloss than ever before. An isobutylated melamine-formaldehyde resin, Cymel 255-10 delivers 60° gloss readings above 95—with readings of 98 obtained. Cymel 255-10 offers greater adhesion to metals, improved detergent and mild alkali resistance, greater enamel stability. In addition, you get unusual speed of cure. For complete technical information on this newest achievement in melamine coating resins, write or call your Cyanamid representative.

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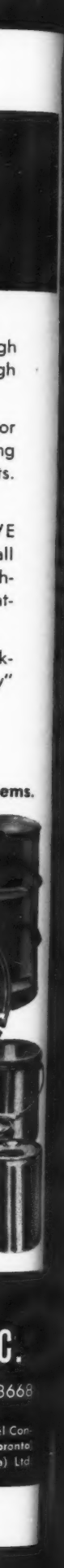
Executive Offices: 3075 No. 35th Ave. (P.O. Box 1510) Birmingham, Ala., Telephone VI 1-8668

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